Paper TRADE JOURNAL

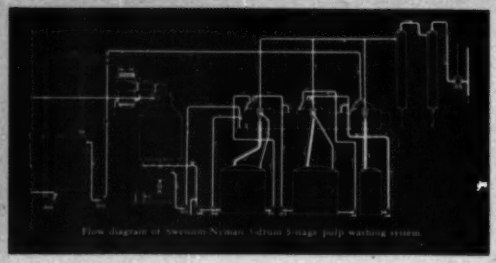
Jan. 19, 1951

CAUSES OF ELECTRICAL EQUIPMENT CORROSION AND METHODS OF PREVENTION

AN UNUSUAL METHOD OF CONTINUOUS STOCK PREPARATION IN A FINNISH PAPER MILL

DESCRIPTIONS OF FIBER DIFFERENCES IN PULPS OF VARIOUS WOODS FROM DIFFERENT SECTIONS OF THE COUNTRY

PULP IS WASHED CLEANER with Swenson-Nyman Equipment



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Paper TRADE JOURNAL

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DATES TO REMEMBER

JANUARY 22-26: Tenth International Heating & Ventilating Exposition, Commercial Museum, Philadelphia, Pa. (Am. Society of Heating & Ventilating Engineers).

JANUARY 24-26: Canadian Pulp & Paper Assn., Mount Royal Hotel, Montreal, Que.

FEBRUARY 19-23: Technical Assn. of Pulp & Paper Industry, Annual Meeting, Hotel Commodore, N. Y. C.

FEBRUARY 19-22: American Paper & Pulp Assn., Annual Meeting, Waldorf-Astoria Hotel, N. Y. C.

FEBRUARY 21: Mass. Institute of Technology Alumni, Annual Luncheon in connection with TAPPI convention; 12:00 noon, Engineer's Club, N.Y.C.

FEBRUARY 21: New York State College of Forestry, Paper and Pulp Alumni: Annual Luncheon, Hendrick Hudson Room, Roosevelt Hotel, N. Y. C.

FEBRUARY 21: University of Maine, Paper and Pulp Alumni: Annual Meeting, Biltmore Hotel, N. Y. C.

FEBRUARY 19-22: Nat'l Council for Stream Improvement, Annual Meeting, Waldorf-Astoria, New York City.

FEBRUARY 20-22: 17th Products Show by Purchasing Agents Assn. of Chicago, Hotel Sherman, Chicago, Ill.

NEXT WEEK

No. X in our Corrosion series, "Stainless Steel Castings, Valves and Fittings" by N. S. Mott, Chief Chemist, Metallurgist, Copper Alloy Foundry Co., Hillside, N. J. describes the uses of these products in preventing corrosion.

A new type of sawtooth, which may save a large percentage of wood that is now wasted as sawdust, is described in "Sawteeth in Action," by L. H. Reineke, Forest Products Laboratory, Madison, Wis.

The tremendous waste of wood, together with methods for possible reduction of this waste are described in "Wood Waste in the Douglas Fir Region" by F. W. Guernsey, Forest Products Engineer, Vancouver Laboratory, Forest Products Laboratory of Canada, Vancouver, B. C.

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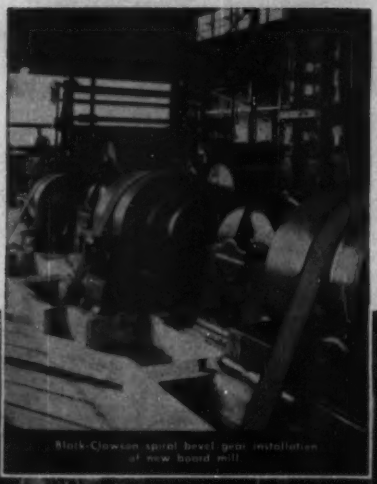
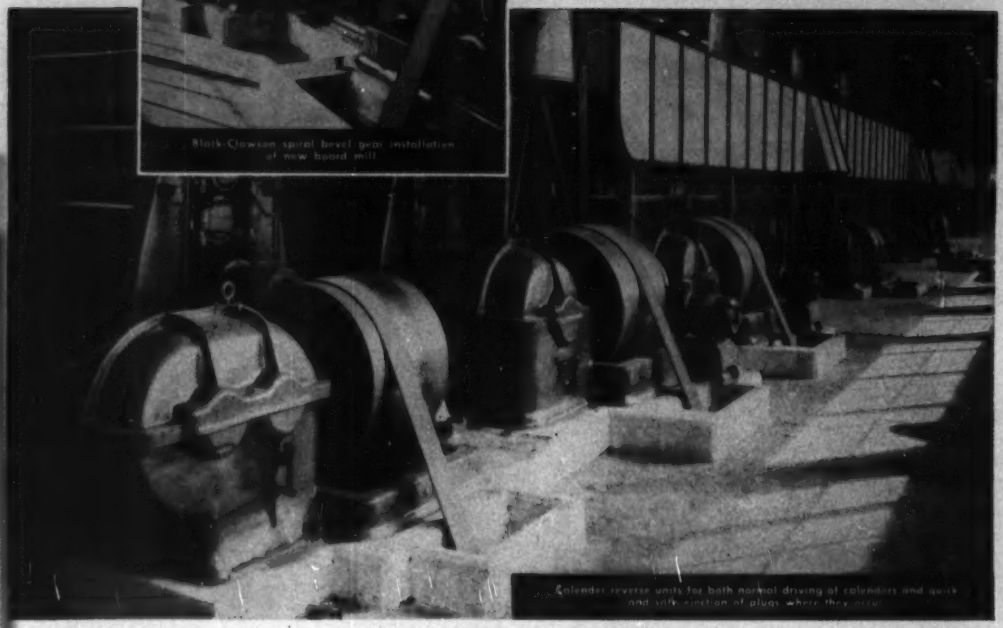


Black-Clawson spiral bevel gear installation at new board mill

The DRIVE
that really pays off



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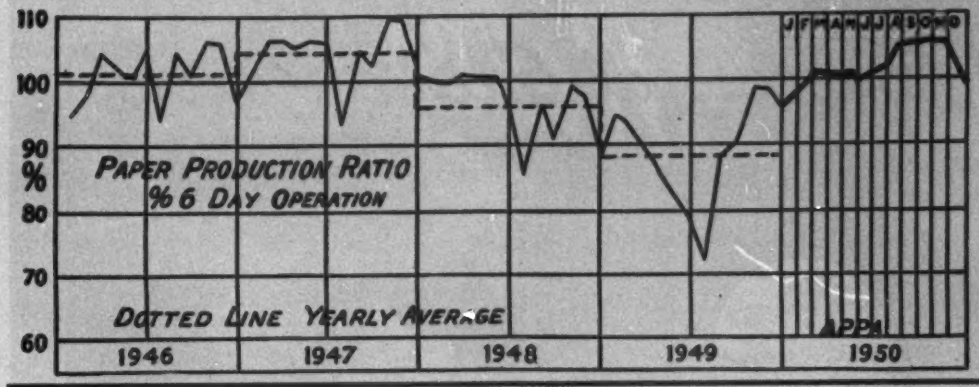
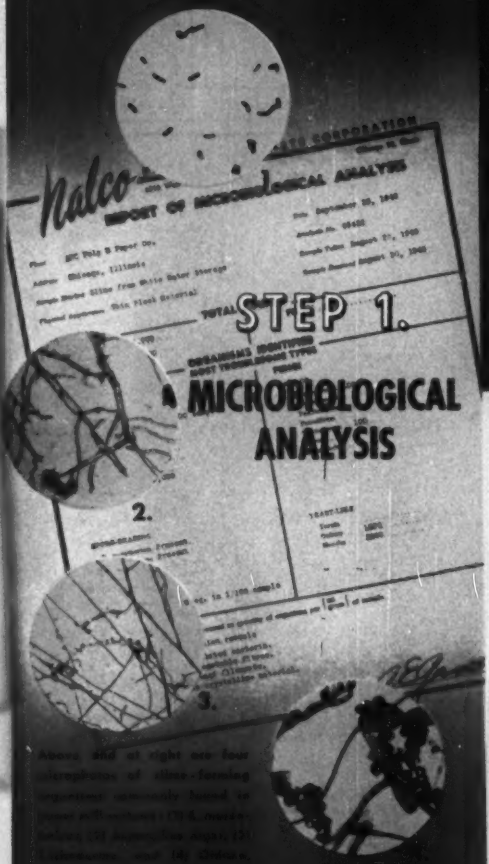


Weekly Brief of Important Figures

Source	Production	WEEK ENDING Jan. 6, '51[x]	Dec. 9, '50	Jan. 7, '50
APPA	Paper Production Percent Capacity	94.9	101.3	88.2
	Unbl. Kraft Paper Production Percent	94.9	98.1	92.8
NPA	Paperboard Operating Ratio Percent Inch Hours	91.0	106.0	74.0
		Nov. 1950	**Oct. 1950x**	**Nov. 1949**
APPA	Paper Production* (Except Newsprint and Building Papers) ....Tons	872,000	841,000	762,099
	New Orders ....Tons	831,000	836,000	754,993
	Unfilled Orders ....Tons	869,900	899,200	496,770
	Shipments ....Tons	872,000	850,000	755,367
		Dec. 1950	**Nov. 1950**	**Dec. 1949**
NPA	Paperboard Production ....Tons	862,905	1,168,958	827,400
	New Orders ....Tons	778,394	1,225,369	801,200
	Unfilled Orders ....Tons	617,245	722,046	359,300
	Our Customers Activities Index[1]	**Latest Mo.[c]**	**Previous Mo.**	**Year Ago[c]**
FRS	Manufactures Total Index	228	225	179
	Durable Mfg. Index	262	254	176
	Nondurable Mfg. Index	201	201	181
	Chemical Products Index	280	272	245
	Mfg. Food Products Index	178	193	177
	Printing and Publishing Index	181	173	169
ODC	Magazine Advg.-Printer's Ink Index	342	338	294
	Retail Sales Combined Adjusted Index	323.3	332.3	294.4
	Drug Index	223.4	227.8	220.0
	General Merchandise Group Index	299.2	321.5	273.9
	Grocery and Combination Index	394.7	391.2	358.8
	Prices Index			
BLS	Consumers Price Index[1]	174.8	173.8	168.5
	Wholesale all Commodities[2]	169.1	169.5	152.2
	Wholesale Foods[2]	172.5	177.2	159.6
	Commodities other than Farm Products and Foods[2]	161.5	159.2	145.0
	Wholesale Pulp and Paper[2]	173.4	167.1	156.5
	Purchasing Power of Dollar, Consumers Prices[1]	47.8	48.0	49.9
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	403.6	393.9	335.1
	Unemployment Compensation Initial Claims (M)	720	558	1,363
	Miscellaneous Carloadings–Thousands of Cars	1,673	1,963	1,277
	Electric Output (Million KW hr.)	34,307	32,650	28,169
PTJ	Average 32 P & P Common Stocks as of Jan. 9	$35.24	$32.95	$27.88
	Average Indicated Dividends Common Stocks as of Jan. 9	$ 2.39	$ 2.54	$ 2.27

[1] 1935-39=100 Unadjusted Index
[2] 1926=100
[c] New 6-7 day basis.
* For details see APPA Monthly Statistical Summary—November 1950 Estimated Figures
[c] Latest Month Available on Request
x Unrevised figures.

Successful Nalco Slime Control



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- Chemical Survey.
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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 17, 1951.

Supplies-Materials

During the past week several suppliers have talked to *Paper Trade Journal* about the serious situation regarding DO orders. They are concerned because the paper industry is at the bottom of the list, that textiles, leather and other industries are draining off chemicals which normally go to us. Wool cannot be bought for love or at a price, demands of the armed forces are sky rocketing, and a new clip will not be available until summer at least.

We cannot have paper without woolen felts. In 1939, about 5,000,000 pounds were consumed in the paper industry. This increased in 1947 to a little over 7,000,000 pounds, the 1950 consumption was close to 8,000,000 pounds, and current yearly consumption rate is nearly 9,000,000 pounds.

This is a small amount in the total annual wool business which fluctuates between 30 to 60 million pounds per month. The full allotment to the paper industry would have slight drain over all.

But pulp and paper can not be made without wool. We need about six ounces per ton of paper. Wool is exactly in the same class as copper, without both, no paper.

As we understand it, DO's cannot be used for operating supplies or maintenance. Only those items that go directly into the manufactured article can use a rating. The major exception is packaging. Thus we find our product can be rated but the two most essential operating supplies cannot.

Checking with several mills about their situation and how their supplier's deliveries are, we learn that they are being remarkably well taken care of. *No pinch so far and they hope that DO's will be soon superseded by CMP before there is a pinch.*

So far we are fortunate. Certainly the speed with which APPA got action on copper and sulphur deserves praise. *There is no doubt that they will also take prompt action on wool.*

We need a DO for the whole industry. *N.P.A. granted one last week to the Air Transport group. It covers new plane construction, maintenance and operating equipment.*

These orders will have the same status as military projects.

Forest Products

For many years pulp and paper and lumber and timber basic products have been administered as forest products. They have little in common except for the basic raw material. From that point on, there appears little reason for this tie-up.

These two basic industries should be split so each may gain its rightful place.

On a basis of "Value Added by Manufacture" a common yardstick, pulp and paper is slightly larger than lumber. Each in turn is larger than rubber, petroleum and coal products and leather.

If it is sound logic to have paper and lumber together, why not combine rubber and petroleum products or add printing and publishing to the Forest products?

Certainly there were many hours lost in the WPB days by papermen trying to tell lumbermen the paper facts of life and vice versa.

The manufacturing methods are different, manpower problems and skills are not comparable. There is little in common about the supply problems. Even the language is different.

Let's have a *Pulp, Paper and Allied Products Division equal in rank* with food, chemicals and rubber. The added efficiency will pay off and *that's what we need right now.*

Paper Containers

It is always interesting to see when metal gets tight how people turn to paper containers for paint, baking powder and so on down a long list. Now the trend has started again, though of course it is not confined to packaging alone. People seem to naturally turn to paper. There appears to be lots of it. It's versatile, and can be adapted to production line operations like the metals without too great expense.

What these substitutes fail to realize is that paper is tight also. Most of them think that it is easy to make more. They also fail to realize that few of these switches in the past have been permanent, and that will not keep the mills going over a long period.

Somehow we fail to get the story across; what it takes to make paper, how it is made, and that it is not a case of just opening the valves another turn.

We must tell more people, more about paper, for the benefit of all.

Market Briefs

WASHINGTON — Chlorine and burlap were among items which NPA this week added to its earlier order against hoarding — designed to limit inventories of strategic or scarce materials to reasonable working levels.

WASHINGTON—Small firms accounted for 73 percent of contracts for container purchases by the military services in the past fiscal year, the Defense Department reported this week.

OTTAWA — Book and bond paper prices are reportedly up $25 to $30 a ton in Canada, according to grade, with this latest increase following on a November boost of $15 to $20 a ton and several earlier increases.

State of Business

The Chicago Purchasing Agents represents a good cross section of conditions. Their December report offers considerable food for thought. Compared to the same month in 1949, it shows:

	Dec. 1950	Dec. 1949
Vendor performance		
Slower	70%	20%
Prices Paid		
Higher	96%	12%
Inventories principal items bought		
Larger	21%	15%
Smaller	41%	38%
Production own plant		
Higher	26%	28%
Lower	18%	20%
Buying in advance to save delivery		
90 days or longer	35%	2%
Business Conditions Own Company		
Standpoint Volume × Profit		
Better	23%	25%
Worse	17%	17%
Price Rollback		
Have you been notified by suppliers?		
Yes	5%	
No.	95%	

—H. J. P.

Materials

Casein.—Domestic market firm, production light with tightening supply, demand fairly active. Prices of standard and premium grades rise 1c.

Strong market reported for Argentine as price-resisting mills start buying again. Stocks moderately heavy but well held. Prices strong.

Corn Starch.—Prices advanced 20c on January 10 to $5.92 cwt. for pearl, carlots, works; $7.29 for white dextrines. Orders accepted only on basis of 30-day requirements and price prevailing date of shipment. Sharp buying noted.

Resins.—Announcement that the Government will no longer sell CCC stocks for export has pushed up the market price sharply. Dealer stocks are low and are being conserved for preferred and foreign buyers who now must buy in the market. Grades GHI shot up 56c to $8.79; K, 29c to $8.79.

Price support program for 1951 still stalled in Washington.

CCC stocks continue to sell at December price.

Nickel Mill Products.—In view of the nation-wide voluntary price freeze requested by the ESA, a major producer has rolled back prices by amounts ranging ½c to 5c per pound. The price rise of 2½c announced on December 13 for primary nickel sold in Canada or exported to other world markets remains unchanged.

Paperboard Production (Tons)*

	Jan. 7 1951	Dec. 30 1950	Jan. 6 1950
Production	207,870	139,385	170,281
New Orders	319,609	158,208	210,930
Unfilled Orders	727,579	617,245	399,645

* Source: NPA.

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News of the Week

Paper TRADE JOURNAL

BUY NORTH WILBRAHAM MILL

HOLYOKE, Mass.—Robert W. Pattison and Joseph H. Barowsky have disposed of their holdings in the Cellulose Fibres, Inc., and have formed two new corporations which will work out of the former Collins Mfg. Co. plant at North Wilbraham. A Boston group have taken over the Holyoke concern, and its operations are being directed by Raymond Jacobson.

The two new firms at North Wilbraham will be known as the Cellulose Pulp Products, Inc., of which Mr. Pattison will be president and general manager, and Mr. Barowsky will be treasurer; and the Holyoke Pulp & Paper Corp., in which Mr. Pattison will be treasurer and general manager. The president will be John C. Lowe, who is head of the Lowe Paper Machinery Corp.

The two concerns will employ about 40 persons. Lucien A. Laurin has been named general superintendent. He had been boss machine tender for the American Writing Paper Corp. at its Riverside Division until that unit was closed down. He more recently had been assistant superintendent at the Crockery Division.

The Cellulose Pulp Products, Inc., will make cotton pulp and cellulose products and cotton content paper.

Holyoke Pulp & Paper Corp. will manufacture de-ink waste paper to produce bleached pulp for resale.

FIBER DRUM SCARCITY

WASHINGTON, D. C.—Re-use of fiber drums and similar containers is essential, in view of current industry problems, NPA representatives told members of the fiber drum manufacturing industry at a meeting last week.

Industry spokesmen reported their biggest problem now is getting paper board and steel sufficient to manufacture drums for the mounting demand. At present, they said, there is a 90-day backlog of fiber drum orders, despite that many plants are working extra shifts. If they could get enough paper board and steel, however, the industry spokesmen told NPA officials, they could nearly double production with just the present facilities.

Supplies of adhesives and paper coatings used in fiber drum manufacture and related containers have been ample, NPA was told, trouble has been encountered in obtaining kraft liner board needed for packaging of some products.

The meeting stressed need of utilizing waste paper and other products to stretch supplies in drum production and for other shipping container manufacture. A subcommittee was named to report on recommendations for a possible end-use limitation and control order at some future date, and for reducing steel requirements for hoops, drums, drum heads and bottoms.

LIMIT CHEMICALS FOR V-BOARD

WASHINGTON, D. C.—N.P.A. limited military contractors making V-board to 25,000 tons of polyvinyl alcohol during January. The action was taken to provide more of the scarce chemical for plants making nylon and tire cord, milk cartons, and adhesives. N.P.A. also shifted a quantity of vinyl acetate monomer from V-board to milk cartons.

REDUCE SURPLUS OFFERS

WASHINGTON, D. C.—The government is beginning to reduce the quantities of surplus commodities offered for sale each month by Commodity Credit Corporation, it was noted when the January lists were announced.

While the sharpest curtailment was in linseed oil offered for export or domestic sale during the month, which the CCC explained was due to the uncertain supply situation resulting from possible war demand, there was a reduction also in the amount of gum rosin offered, to 75,000 drums. The price for domestic sale ranges from $8.50 to $9, according to grade, storage yards in Georgia and Florida.

Potato starch offerings for January were more in line with earlier announcements, 600,000 pounds of pearl type, rising to 3,500,000 pounds of powdered starch, carload lots, f.o.b. Maine shipping points.

However, a strong indication was seen that these quantities might not remain on the market long, due to demand for raw material for industrial alcohol for the synthetic rubber program. While it has not been officially announced, it is known that the Agriculture Department is strongly considering advisability of re-imposing grain allocations for many industrial uses, including alcoholic beverage distilling, and probably some industrial alcohol production.

This allocation order may be put in effect within the next three months, according to closely informed authorities here, and a move is on foot to shift some grain use to surplus potatoes. In fact, the Commodity Credit Corporation, in offering starch for January sale, stated that "offers will be considered for the purchase of potato starch for use in the manufacture of industrial alcohol."

During 1950, through December 21, the latest for which figures are available, the CCC has sold 5,291,789 pounds of potato starch, but has been under constant pressure to find outlets for the large potato stocks accumulated through price support encouragement to growers.

The demand for industrial alcohol proved providential both as to grain and potatoes, but there is a strong sentiment, in view of possible future grain demand for food or stock feed, to maneuver alcohol production onto surplus potatoes. If this proves successful, starch offerings may likewise follow the commodities now being pulled back from too rapid disposal as surplus.

INTEGRATE CUTTING OPERATION

OTTAWA—Great Lakes Paper Co., Ltd., and Northern Wood Preservers, Ltd., in full accordance with the forest policy of the Ontario Government, have announced that all future cutting operations on areas held under their respective concession agreements with the Crown will be completely integrated. Larger sized timber that may be economically used for poles, railroad ties, lumber, etc., will be delivered to Northern Wood Preservers in Port Arthur, whereas pulpwood timber encountered in such operations will go to Great Lakes Paper Co. in Fort William.

While a mutuality of interest between the two companies has been recognized for some time and substantial quantities of the larger timber have been sold to Northern Wood Preservers by Great Lakes, it is only after several months of negotiations by which Great Lakes Paper has acquired a substantial stock interest in Northern Wood Preservers that this policy of full cooperation and partnership has been developed.

Great Lakes Paper Co. will be represented on the new board of directors of Northern Wood Preservers, Ltd. However, the latter company will retain its identity and R. J. Prettie will continue as president and managing director.

The woodlands department of the Great Lakes Paper Co., whose personnel is trained and experienced in forestry and production, will be available to assist small owners of wood lots and other producers in reforestation, conservation and production plans.

DIVISION OF EASTMAN KODAK

Tennessee Eastman Corp., wholly-owned subsidiary of Eastman Kodak Co., has been dissolved as a separate corporation and became a division of the parent company on January 1.

The business, owned and operated by Tennessee Eastman Corp., at Kingsport, Tenn., will hereafter continue to be conducted in the name of Tennessee Eastman Co., Division of Eastman Kodak Co., Kingsport, Tenn.

The division will continue the same manufacturing, selling and other activities with no change in personnel or policies.

Orders, invoices and correspondence relating to Tennessee Eastman products and business will continue to be handled through the same offices and by the same individuals. A. M. Tenney Associates, Inc., will continue as the sales representative for Eastman fibers. Checks dated after December, 1950, may be made payable to Tennessee Eastman Co. Accounts payable and other obligations of Tennessee Eastman Corp. will be honored by Tennessee Eastman Co.

STREAM IMPROVEMENT FUNDS

WASHINGTON, D. C. — Funds available for water pollution control would be virtually doubled, under a bill introduced at the opening session of Congress by Rep. James J. Murphy, Dem., New York.

The bill would amend the Water Pollution Control Act by appropriating $50 million in place of $22,500,000 now available for loans to states, municipalities and interstate agencies for treatment works, preparation of engineering data, and other plans in connection with pollution control.

STREAM IMPROVEMENT ORDER

KALAMAZOO, Mich. — The Michigan Water Resources Board on December 20 directed 12 paper mills, three cities and one township to complete the initial phases of the cleanup of the Kalamazoo River by June 1, 1953.

Action on the three cities demands that they complete sewage treatment plants. The order adopted by the commission and affecting the paper mills will be far reaching, but less drastic.

The mills will be required to meet minimum standards recommended by commission staff engineers. This will include installation of settling plants to remove solids from sewage discharged into the river. Commissioners indicated that this step, to be completed by June 1, 1953, will then lead toward the ultimate objective proposed for the paper mills. This would include treatment measure designed to increase the oxygen content of the water.

Paper mill representatives cited inability to secure critical materials as a factor making immediate construction of treatment plants extremely difficult. A few mill spokesmen voiced some fears that the added cost of building and operating treatment plants might necessitate price increases which would place Michigan mills at a disadvantage in the competitive market.

The paper mills included those in Kalamazoo, Three Rivers, Watervliet, Otsego and Plainwell.

R. A. HAYWOOD

Ralph A. Haywood, 55, died on Friday, January 12, at Ann Arbor. Mr. Haywood started in the paper industry as resident engineer with Spanish River, after earning his tuition to University of Michigan by serving as a quartermaster on the Great Lakes. From that first job he progressed steadily upward through connection with R. B. Wolf, Fraser, Miami Paper and Newton Falls. In 1925 he became general manager of Kalamazoo Vegetable Parchment Co. He was elected to the board of directors in 1928. He became president in 1936.

Mr. Haywood was very active in many community and state affairs, serving as a Regent of University of Michigan, on many boards and committees of APPA, CPPA, National Manufacturers Association, Kiwanis, WPB. He was president of TAPPI in 1942 and 1943.

How Is Your Atomic Defense?

Do you know too much planning may be as bad as too little?

What can be done to protect your property?

What will probably be the legal complications?

What about insurance?

Are there any ways of protecting your business position?

What about your people?

The Research Institute of America has just completed a study of the possibilities based on the British, German and Japanese experience. Its coverage is complete and factual. A copy may be obtained for the asking. It will be mighty handy in making your plans.

CUSTOMS COURT CASES

Among the new cases appearing on the docket of the United States Customs Court are the following protests filed by importers, according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry. Unbound sheets of English missals, classified for duty at the rate for bible paper of 11 pounds basis weight, claimed to be dutiable at 5 percent as printed matter of foreign authorship; twenty-five cases at Philadelphia and two at New York in which Finnish wrapping paper was held to have been undervalued; four cases in which napkins are claimed to be dutiable at the rate for paper cut into shapes which will probably be dropped in accordance with a recent decision by the Customs Court; converted toilet paper rolls, classified at Chicago as manufactures of paper, claimed to be dutiable at the lower rate for paper cut into shapes.

EXCELLENTLY MANAGED FIRMS

Ten companies in the paper industry are among 238 firms throughout the United States and Canada which are being awarded "Certificates of Management Excellence" for the year 1950 by the American Institute of Management, New York. The awards, which will be bestowed annually hereafter by the Institute, are based on its continuing study of more than 2,000 leading concerns — designed to provide a base for research into corporate policies and procedures.

The ten honored companies referred to include: The Champion Paper & Fibre Co., Hamilton, Ohio; Container Corp. of America, Chicago; Crown Zellerbach Corp., San Francisco; Great Northern Paper Co., Millinocket, Me.; The Hinde & Dauch Paper Co., Sandusky, Ohio; International Paper Co., New York; Marathon Corp., Menasha, Wis.; St. Regis Paper Co., New York; Scott Paper Co., Chester, Pa.; West Virginia Pulp & Paper Co., New York.

In weighing the merits of each management, Mr. Martindell explained, credits are given for excellence in ten separate fields — economic function, corporate structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor and executive evaluation.

UNION BAG SELLS

General Electric Co. announced purchase of a major part of the Union Bag & Paper Corp.'s holding at Hudson Falls, N. Y.

John T. Holleran, manager of the GE plant at nearby Fort Edward, said GE would use the property for expansion of facilities for manufacturing capacitors — small transformers for electric devices.

Union Bag has concentrated its operations at Fenimore, across the Hudson River from Hudson Falls.

ARE YOU LETTING THESE EXPENSIVE FIBRES GET AWAY?

There never was a time when an adequate Bird Save-All closed white water system was more essential or more profitable than it is right now.

Take a look at the water leaving the paper machine. Are *you* letting any of it get away without rescuing those valuable papermaking fibres? If so, now is the time to look into

BIRD SAVE-ALLS

BIRD MACHINE COMPANY

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The 1951 Outlook For Canada

OTTAWA — With production in 1950 expected to indicate a new record for the pulp and paper industry of Canada, it is believed that production in 1951 will run into many serious difficulties because the industry may be caught in the "squeeze" between civilian and defense needs. The blueprinting by Canadian pulp and paper companies of their activities in the coming months may be affected by international events to a far greater degree than at any other time in history.

Pulp and paper company officials are planning a record production in 1951, according to year-end predictions. However, there is no effort to conceal deep concern about likely obstacles arising out of the "squeeze" in which the industry may find itself.

The president and general manager of one of the largest paper firms in Canada has already gone on record, in a year-end review and forecast for 1951, with a statement that "the outlook for 1951 in any sphere is beclouded by the danger of a third world war."

"The watchword must be production, production to sustain the armed forces, production to sustain the home front and so ensure more production," he states. "It seems quite clear that is to be the central thought in all planning which will be done in 1951. It is not so clear that all the planners are familiar with the mechanism of production or know the right buttons to push."

"The operators of industry, therefore, have a clear duty to perform," he continues. "They must be ready to produce the goods and services which will contribute most effectively and with the least possible use of manpower and resources, and finally they must use their knowledge and their energy fearlessly in guiding the planners. It is no light task but it can be done."

Pulp and paper production in 1951 will depend on the supply of raw materials, availability of manpower and possible carrying out of present expansion programs, with orders being no problem this year.

In the first place, expert opinion in Ottawa indicates clearly that the supply of raw materials may be affected adversely by the defense program. Already broad hints are heard that certain essential chemicals may be in short supply and the same uncertainty exists for other requirements in operations of the pulp and paper companies in 1951. Nevertheless, this is not expected to be serious unless the civilian economy is so changed by the defense program that these raw materials will have to be diverted on a large-scale for other purposes.

In the second place, the availability of manpower both for operations in the "bush" and in the plants is more likely to be affected. In the case of Canada, it is not believed that this manpower would be taken up by the armed services in as large measure as in other countries. The shortages for the pulp and paper industry would arise from the fact that more and more manpower will be absorbed by defense industries which are now being geared to the greatest activities since the end of World War II. Of course, if the war should be a "total war" and total mobilization come about, the armed services would cut seriously the supply of manpower, but thus far opinions heard in this capital do not seem to think this is likely to occur in 1951. This factor of manpower appears to be stronger than the raw materials problem.

In the third place, pulp and paper companies' plans for expansion may have to be curtailed or shelved entirely during 1951. In the course of converting Canada's economy from a peacetime to a wartime basis, stage by stage, such enterprises may suffer a complete blackout due to shortages of materials and manpower. If this is not done voluntarily, it would not be surprising if the Canadian Government would halt any program which could upset defense programs. In view of the record of the pulp and paper industry of cooperating readily with the federal authorities during national emergencies, there is no doubt that the companies will halt expansion or any changes which are likely to interfere with defense preparations.

Pulp and paper prices are going up in 1951, judging from developments which occurred in the industry towards the end of 1950. The demand for all grades of pulp is soaring, including bleached and unbleached grades. In fact, new record price boosts are openly predicted for early in 1951, and if costs of production continue to rise amidst increasing demands for defense purposes, the supply picture may become even tighter and prices advance further than can be foreseen at this time.

It is no secret that many pulp and paper companies in Canada are becoming more and more concerned about such rising costs. It costs more now to cut the wood, more to bring it out, more to manufacture the finished products, and more to ship the latter to the customers. Woods workers in 1950 demanded more and got it, with strong hints that their demands may be for higher wages in 1951, especially when the armed services and defense plants take away many men who might have worked in the woods. Wages and salaries in the pulp and paper products plants of Canada rose steadily in 1950. In fact, at October 1, the average wages and salaries amounted to $54.15 as against $53.59 at September 1. A year ago October 1 this amounted to $50.36. In addition, the latest official survey discloses average hourly earnings rose to 116.1c at October 1 compared with 115.7c at September 1 and 108.5c at October 1, 1949. On top of all these higher costs, shipping of pulp and paper products by truck or rail is definitely going to increase in the coming months, with the railways already stating that they intend to apply for higher freight rates in 1951.

The pulp and paper industry is facing 1951 with the specific prospect of having to pay higher taxes because it is now no secret in Ottawa that the federal authorities are planning to boost taxes in tune with the much higher defense costs on the principle of paying for defense on a "pay-as-you-go" policy. The 1951 defense spending by the Canadian Government is expected to be very much larger than the "over the $1 billion" which had been forecast recently.

Finally, the pulp and paper industry is starting its 1951 operations under a rash of rumors arising from widespread speculation that controls may be imposed in Canada if the present international situation deteriorates and it is decided to declare a state of national emergency in this country. When such controls come, this would change the whole schedule of companies for 1951, affecting production adversely.

It is evident that the operations of the pulp and paper industry across Canada during 1951 will continue at a high level and production will exceed even the new record output of 1950 unless such operations are affected by the reactions within Canada to the international scene. It is a growing belief in informed quarters that the industry will run into serious difficulties if the defense program is intensified beyond present expectations. It is this "squeeze" between the defense program and normal operations which will determine the accomplishments of the pulp and paper industry during the coming months.

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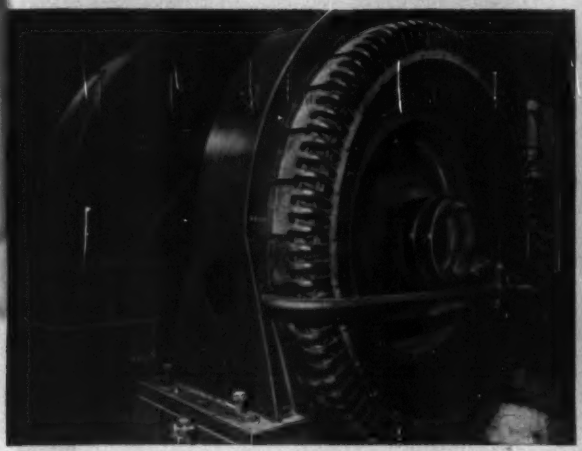
LOW-COST LOG-HAULING! You're off to a good start when logs are moved through your mill by G-E diesel-electric switching locomotives. Made in standard sizes from 25 to 95 tons for industrial use, they have 90 to 95 per cent availability for service, need only a one-man crew, and cut fuel costs materially. Because they emit no cinders or smoke, fire hazards around the wood yard are lessened and greater cleanliness is maintained. Here, a 65-ton G-E diesel-electric switcher feeds a string of loaded cars into a California pulp mill.

Less downtime...



MORE CHIPS IN LESS TIME! Providing high service continuity in wood-chipper service, G-E synchronous motors hold their speed regardless of log size, are sturdily built to withstand shock loads. Here, a G-E 600-hp 327-rpm 2200-volt synchronous motor drives a chipper in a northwestern pulp mill.

COMPLETE MOTOR PROTECTION! For motors up to 5000 volts driving chippers, barkers, etc., G-E Limitamp controllers provide centralized control and short-circuit protection, preventing extensive equipment damage, reducing costly shutdowns.

GENERAL ELECTRIC

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HIGH-TONNAGE BARKING! Whether you use mechanical or hydraulic barkers, the right G-E motor can be depended on to meet your needs, for years of performance in high-tonnage duty. Here, a G-E 150-hp 2300-volt splashproof motor (under canopy) drives two mechanical barkers in a southern pulp mill.

LOW-MAINTENANCE PUMPING! On pumps in all types of pulp mills, years of experience have proved G-E motors need but little upkeep, as in this installation in a western mill, where G-E 100- and 60-hp open (dripproof) motors drive centrifugal pumps in its river pump house.

from logs to laps!

HIGH-EFFICIENCY GRINDING! In this Southern newsprint mill, four G-E synchronous motors rated 4000 hp, 6900 volts, 200 rpm each, drive grinders on other side of wall. Highly efficient, G-E synchronous motors also maintain constant speed regardless of whether the grinder pockets are partly or completely filled.

G-E equipment for pulp mills—engineered to your needs by skilled industry specialists—helps increase production continuity for greater output of uniform-quality pulp.

Every step of the way in pulp-making—from raw logs to finished pulp—General Electric co-ordinated electric equipment can help you boost production continuity, assure pulp uniformity, and cut costs as well.

Here's why: Years of experience in meeting pulp-mill requirements has enabled General Electric to develop a wide range of dependable apparatus. To make doubly sure your selection from this range is correct, your G-E sales engineer and an industry specialist, who know pulp-mill practice and needs, team up to serve you.

With their pooled knowledge to draw on, you're certain to fill your needs in a practical, economical way. Let your G-E representative with his skilled engineering assistance work with you on your pulp-mill modernization plans.

Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GE Co-ordinated Equipment

Corrosion—IX of Series

The Protection of Electric Equipment from Corrosion in Pulp and Paper Mills

G. W. KNAPP[1]

Corrosion is a major enemy of electric apparatus. The ingredients which produce it, chemical agents, moisture, and heat, are inseparable from pulp and paper manufacture. These things cannot be changed and the electric equipment must be so applied that it does its job despite them. Otherwise electrical outages and costly shutdowns may result.

Corrosion attacks electric equipment in two ways, mechanically and electrically. It interferes with or disrupts its *mechanical* performance — breakers will not open up when they should; holes are made in enclosures whose purpose it is to protect vital insides. Corrosion also interferes with *electrical* performance — fine wire in coils may be eaten away to interrupt a control circuit; flashovers may occur across insulating surfaces because of conducting deposits of corrosives and moisture, etc.

There are two ways of minimizing the effect of corrosion on electric equipment, and they may be used independently or in combination. First, the immediate operating environment of the equipment can be freed from corrosive agents, moisture, and heat, by suitable enclosures. Second, special treatments can be given to the components making up the equipment to improve their ability to resist corrosion. The use of enclosures has proved itself generally to be the better solution since it permits the application of standard, readily available electric equipment, and will usually have a lower first cost.

Anti-Corrosion Treatment for Standard Equipment

All electric apparatus is treated to resist corrosion in exposed parts. In general, these treatments work well under mild conditions of moisture and corrosives, but under severe conditions corrosion can occur with subsequent damage.

The steel surfaces of non-working parts receive special preparation (frequently phosphate treatment), then priming and finish painting using alkyd resin type paints which resist mild concentrations of acids and alkali. Whenever size permits, these parts are baked.

Working steel parts are plated, usually with zinc. All hardware (nuts, bolts, washers, screws, etc.) are also plated.

Exposed current carrying copper parts are usually plated with zinc or tin. In large sizes such as bus bars this may be omitted, since moderate corrosion does not affect their electrical operation. For bronze or brass parts, plating may not be necessary, where moderate corrosion will not affect performance. (For example, considerable experience with bronze boxes in brush holders has proved their ability to do the job.)

Insulating materials always receive protective treatment to prevent destruction of their insulating value by corrosives and moisture. Static devices such as transformers and capacitors may be protected in the best possible way by immersion in oil or askarel (non-inflammable oil). Such protection is almost ideal and is a big reason for the remarkable operating record of such equipment over the years. Dry type (oilless) transformers, with very many ventilating passages, do not have such protection and should only be used when the air is relatively free from moisture or corrosives. However, recently dry type transformers in sealed tanks filled with inert gas have been brought out and they should be as good as askarel-filled. Furthermore, small dry type transformers such as those used for lighting circuits, may be obtained filled with a poured compound which gives excellent protection.

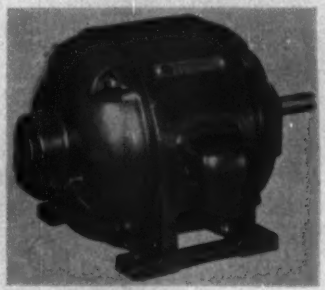


Figure 1—A Squirrel Cage Induction Motor of the Most Modern Type with Resin Type Insulation on the Coil Conductors and an Open-Dripproof Enclosure.

Unfortunately, oil-immersion is not adaptable to motors, and while it is sometimes used with control and switchgear, it has an important disadvantage when circuit interrupters like contractors and breakers are involved. The arc which accompanies interruption promotes sludging of the oil, making it necessary to filter and renew the oil frequently. Furthermore, when the oil is locally sludged by the arc, it loses some of its dielectric value too, so that the contact tips burn more than in air and require more attention and replacement. The design effort therefore has been towards the elimination of oil immersion in controls and switchgear.

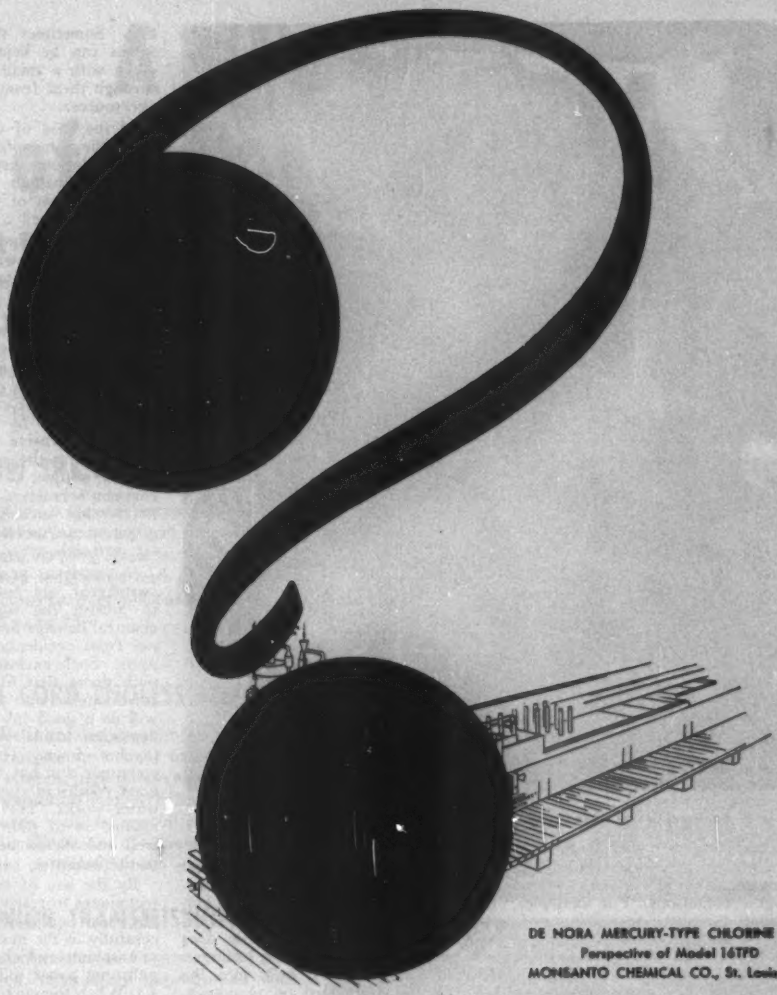
In view of the foregoing, the protection of insulation in motors, controls, and switchgear has been more difficult than in transformers and capacitors, but steady progress is being made.

For motors, the principal problem has been the protection of coil insulation. This is usually done by repeated dips and bakes of the completely wound assembly (stator, rotor, or field coils) using alkyd resin type varnishes. Where size permits, special efforts may be made by using vacuum tanks to get penetration of the varnish. When the equipment is too large for dipping, the varnish is applied by the spray method.

In low voltage a-c motors, the coil conductors themselves may be insulated in Formex wire* rather than cotton or cambric tape. This greatly increases the resistance of the conductor to corrosion and moisture. While this technique has not been developed yet for large machines, it has

[1] Manager, Paper & Textile Division, Industrial Engineering Divisions, General Electric Co., Schenectady, N. Y.

* Trade-mark of General Electric Company reg. U. S. Pat. Office.



DE NORA MERCURY-TYPE CHLORINE CELL
Perspective of Model 16TFD
MONSANTO CHEMICAL CO., St. Louis, Mo.

During World War II, chlorine for the paper industry was seventh on the list of limitation orders. With that reminder, let us suggest that you investigate the possibility of producing your own chlorine, thereby controlling your supply.

Monsanto offers you engineering service on the Monsanto Electrolytic Chlorine Process which has these advantages:

1. **In addition to chlorine of high purity, it delivers rayon-grade caustic up to 73% without evaporators or purification.**
2. **All or part of the caustic production may be replaced by production of sodium sulfide or various other products.**
3. **It employs the De Nora mercury-type cell which has been used commercially for fourteen years. Of all mercury-type cells this is the most rugged and compact. It requires minimum maintenance and a minimum of floor space.**

For complete information on the Monsanto Electrolytic Chlorine Process, write or wire MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1700 South Second Street, St. Louis 4, Missouri.

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CHEMICALS—PLASTICS

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Figure 2—An Inspection of Open-Drippproof Motors after Life Test in Salt Spray Tank.

made a significant improvement in the ability of small motors to operate under adverse conditions. For example, in combination with an open-drip proof enclosure, a number of such machines were installed in a bleach plant five years ago and have operated without an insulation failure since that time. *(Figures 1* and *2.)*

Since moisture as well as chemical fumes are required for corrosive action, much can be done with open motors by keeping them warm even when shut down so that condensation does not occur with temperature changes. Electric space heaters, built into the machine and energized on shutdown, are being employed effectively to do this. Sometimes the windings themselves can be kept warm when shut down with a small amount of current through them from a special low voltage source.

In the case of control and switchgear, the same problem of protecting coil insulation exists. It is handled in a similar manner by putting a final protective coat of alkyd resin varnish on the competed coil assembly.

For such equipment, there is still another problem which lies in the protection of insulating surfaces (such as the plastic base of a relay) from conducting deposits which cause surface creepage and flashovers. These deposits are usually the result of condensation of moisture and chemicals on the surface, or corrosive attacks on the surface. The condensation may be taken care of by suitable preventive means. Corrosive action on the surface requires the use of plastics which are not subject to attack by the most common corrosives. Considerable work to develop such plastic materials is going on continually, and new and better materials are coming into use.

In modern practice, control and switchgear are built with enclosures to protect the equipment from mechanical damage and to protect personnel from accidental contact with live parts. Such enclosures are well made with doors that fit snugly so that in combination with space heaters they will do a good job of preventing condensation inside when the equipment is shut down. This is an excellent technique and has been employed with good results in chemical plants and in water works. The paper industry has applied it to some extent. It works well and should be used more widely in the industry.

By the use of such treatments and techniques to resist corrosion, standard electrical equipment is operating successfully in the moist, mildly corrosive atmospheres which generally exist in pulp and paper mills. *(Figures 3* and *4.)* When the corrosive concentrations are higher because of local process

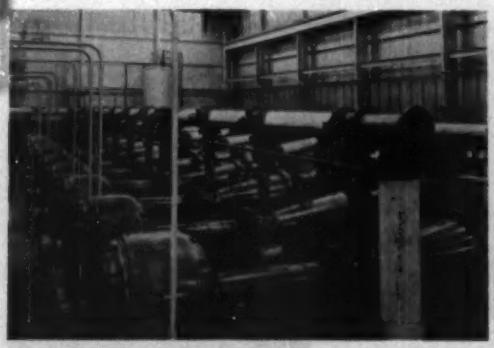

Figure 3—Ten 400 hp., 4160 Volt Synchronous Motors Driving Jordans in a new Northwest Kraft Mill. These Open-Drippproof Machines with Enclosed Collectors Operate without Difficulty in the Moist, Mildly Corrosive Atmosphere Here.

Figure 4—The Jordan Control Panels, with General Purpose Enclosures, Installed in an Open Gallery Immediately above the Jordans.

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U. S. ROYAL TRANSMISSION BELT

Square-cut edge construction, no folds. Made with specially woven hard duck giving unusual strength with low stretch. Friction between plies is the highest quality obtainable, scientifically compounded for long life, extra flexibility. U. S. Royal friction surface provides superior traction on pulleys. Roll and cut lengths or made endless by patented U. S. Royal-Splice or by 'round and 'round method.

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Folded edge construction. A general purpose belt known for outstanding operational economy and for maximum dependability in severe service. Duck is woven to give strength and flexibility lengthwise and body stiffness crosswise. Special friction between plies assures remarkably long flexing and aging life.

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Royal Cord Endless Belts are designed for use on general purpose flat drives, ranging from light to heavy duty, where the use of low stretch, high tensile strength, extra flexible, premium construction, endless belting is mandatory. Furnished in seven weights; special constructions available for use under conditions of excessive oil, heat, abrasion and corrosive chemical fumes.

U. S. ROYAL JUNIOR TRANSMISSION BELT

Designed for small machine drives. Constructed of plies of tough cotton duck, thoroughly impregnated with specially compounded rubber. A light, flexible true-running, elastic belt that performs extremely well at high speeds and withstands frequent shifting. Royal Junior has a wide range of application and requires minimum care.

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For use where long wear, smooth-running, high speed, small pulleys, shock absorption, infrequent take-up and oil resistance are encountered. Light enough to operate at speeds in excess of 10,000 F.P.M., and thin enough to operate over pulleys as small as ½" in diameter.

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Figure 5—An Excellent Example of Modern Control Room Design.

conditions, prevailing winds, proximity to exhaust fumes, etc., special measures must be adopted.

Special Anti-Corrosion Treatment

If it is known that there is only a single corrosive agent, selective treatment to prevent corrosion can be used in some cases with exceptional results. However, this is not the usual situation. Almost always in a pulp or paper mill there are several corrosives involved, so that a general-purpose treatment is required. Because of this, when special anti-corrosion treatment is needed for electrical equipment, it usually means just more of the same general-purpose treatments which are used in standard practice. These additional treatments do help, of course, but the performance of the equipment will not be generally better than standard equipment to any marked extent.

However, for some parts such as bus bars, etc., which do not normally need protection against mildly corrosive atmospheres, there can be a considerable improvement. Bus bars may be plated, or painted with alkyd resin base paint. Connection points for either power or control circuits may be protected by painting. Insulating surfaces like relay bases, bus supports, etc. can also be given protective painting. Flexible shunts for relays or brush leads can be plated with lead or tin.

The flexible shunt problem deserves special mention because it is difficult to get complete plating of the fine wires and still keep the flexibility required. This is apt to be a weak spot in either control or switchgear devices, or brush leads in d-c motors, and should receive extra maintenance attention in the mill. Protective greases which are a comparatively recent development, are now being investigated for this purpose.

The special treatments discussed in the foregoing, cannot be handled in the regular production line set-up in electrical manufacturing plants, so they become relatively costly with respect to standard equipment, especially when compared to small, mass produced components. For the same reason, longer deliveries must be expected. In addition, they are not sufficiently better than standard treatment to do the whole job of protecting against severe corrosive conditions. Because of these things, the method which uses protective enclosures that will be described now, has proved superior and is in much more general use.

Protective Enclosures

Electric equipment may be obtained in its own special enclosure to protect it from corrosion and moisture, or it may be placed in a room designed to do this (control room, power room, etc.). In general, the control room will become the more economical way, as the amount of electric equipment to be enclosed increases. It has other advantages as well. Drawings and test instruments to be used locally with the equipment can be stored in it. Furthermore, it permits the use of more available equipment not having special enclosures.

Control Room

The control room should be ventilated with clean air under pressure to keep out corrosive fumes and moisture. (A good rule of thumb is 120 CFM per KW loss). Usually an outside air intake located away from ventilators, stacks, etc. that are exhausting corrosive gases, will be entirely satisfactory. Under some conditions, however, it may be necessary to filter and wash the incoming air.

The normal leakage of ordinary room construction probably will provide enough air exhaust from the control room. When the room is tightly built, however, adjustable louvres should be installed near the ceiling in sufficient number to avoid hot spots of dead air in the room. The ambient temperature immediately surrounding any of the equipment should not exceed 40 deg. C.

The control room should be well lighted with work space and storage space for blueprints, instruments, and commonly used spare parts like fuses. *(Figure 5)* The control room should not contain uninsulated cold water pipes, which may cause condensation and water dripping on the equipment.

Enclosed Equipment

When only a small amount of electric equipment is involved and it cannot be consolidated readily with any others, special enclosures for the

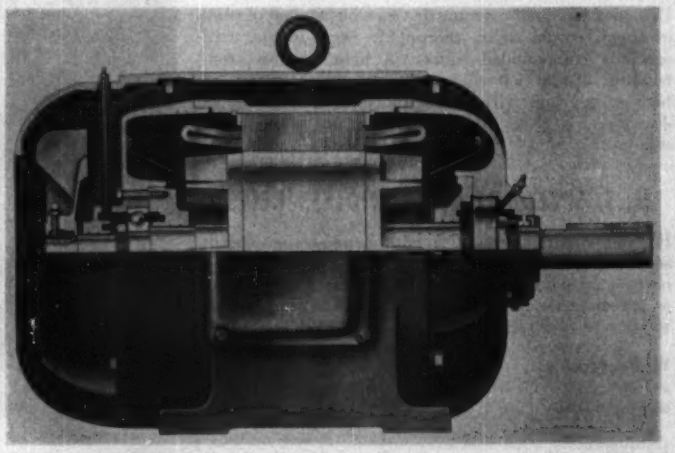

Figure 6—A Totally Enclosed Fan Cooled Induction Motor. Air Enters through a Screened Opening at Left, Passes through Annular Space between Inner and Outer Shells, and Exhausts through Openings around Right end Shields.

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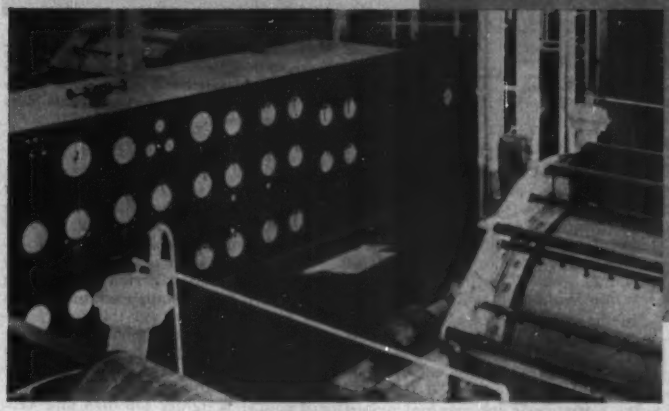
Main Sulfite Bleach Plant Cubicle and one of several washer consoles. Photo courtesy of Minnesota and Ontario Paper Co., International Falls, Minnesota.



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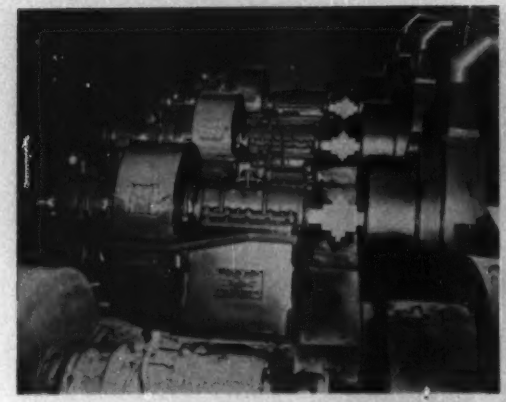


Figure 7—Enclosed Self-Ventilated Motors Driving Sutherland Refiners. Air Enters Motor near Bottom through Pipe from Wall (Not Shown) and is Discharged Outside through Pipe at Top.

Figure 8—Enclosed Separately Ventilated Adjustable Speed D-C Motors for Sectional Paper Machine Drives. Air from a Blower Enters Motors through Duct at Bottom of Left Hand End Shield of Motor in Foreground and Discharges from Opening in Bottom of Right Hand End Shield.

equipment itself, rather than control rooms, may be used to keep out corrosive fumes and moisture. Power distribution equipment like transformers and switchgear almost always justifies the use of a control room in corrosive atmospheres, because of its importance. However, control equipment must sometimes be placed near the process, either to perform its function or because of economics. Motors, of course, must be located at the process. In view of the above, our discussion on protective enclosures will be confined to motors and controls, particularly the former.

Motors

Motors may be obtained totally enclosed so that they are quite effectively sealed against the atmosphere. Some slight breathing with temperature changes may occur, but this is of small consequence. As the motor size increases, this non-ventilated construction becomes more expensive compared to a comparable open-drip proof machine, because the ratio between surface area for dissipating heat and the motor volume producing the heat becomes less as the motor size increases. Hence, while totally enclosed, non-ventilated motors are used in 3 and 5 HP sides for many applications throughout the mill, in larger sizes they become uneconomical and the totally enclosed, fan-cooled machine is employed. This is a totally enclosed motor with forced cooling across the motor shell. It has found wide application in pulp and paper mills for severe corrosion and/or moisture conditions, both indoors and outdoors. *(Figure 6)*

Only the exposed portions of such a motor require the special corrosion treatments already described. The fan is of non-corrodible moulded plastic until it becomes too large for such construction, when corrosion resisting bronze is used.

Totally enclosed, fan-cooled construction is not suitable for adjustable speed motors, since the ventilating efficiency of the fan falls off rapidly with variations in speed. However, the large majority of motors in a mill run at constant speed. For adjustable speed machines, other methods employing separate ventilation will be described.

In the past five years, a substantial number of mills have adopted the general practice of using totally enclosed fan-cooled machines for all constant speed drives up to about 50 HP, even when a particular job may not require it. This gives considerable operating advantage since such a motor can be moved to any location in case of a breakdown regardless of atmospheric conditions, indoors or outdoors.

Above 200 HP the totally enclosed fan-cooled motor becomes quite expensive in first cost, as compared to the standard open machine. Fortunately, motors of this size usually do not have to be capable of operation any place in the mill when a breakdown occurs, so that special attention can be given to each particular installation and corrosive or moisture conditions minimized.

If such conditions require it, large motors may be force cooled with clean air. Enclosures suitable for this may exhaust into the room or exhaust through piping to the outside. *(Figures 7, 8)* If they exhaust into the room, when there is no air flow, moisture and corrosives can get into the motor through the exhaust openings.

The incoming air for the motor may be from the outside if sufficiently clean, or taken through filters and washers if necessary. Large motors, running at constant speed, frequently can be equipped with oversize fans to circulate the air, making a separate blower unnecessary.

When the operating conditions require it, or if the importance of a particular drive justifies it, motors can be built in totally enclosed construction with heat exchangers to cool them. The motor itself is ventilated by air that may be circulated by a blower or an internal fan. The ventilating air in turn may be cooled by an air-to-water heat exchanger. *(Figure 9)* Such construction permits making an extremely tight motor enclosure which is just as suitable as the totally enclosed fan-cooled design for severe corrosive and moisture conditions. In the larger sizes it also becomes less expensive. *(Figure 10)* It does give, of course, a tighter job than pipe ventilating the motor and eliminates the hazard of bringing in contaminated outside air.

Splashproof motor do not have suitable enclosures to protect them against corrosion or moisture since they have ventilating openings for both incoming as well as outgoing air near the floor. Furthermore, if they are standing in a pool of water or in foam, moisture may be sucked into the windings through the intake air opening. They

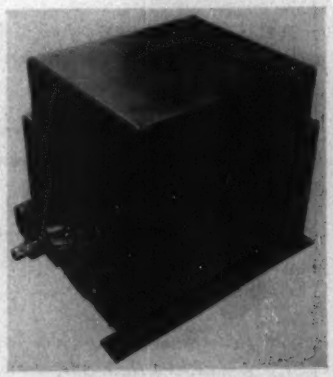
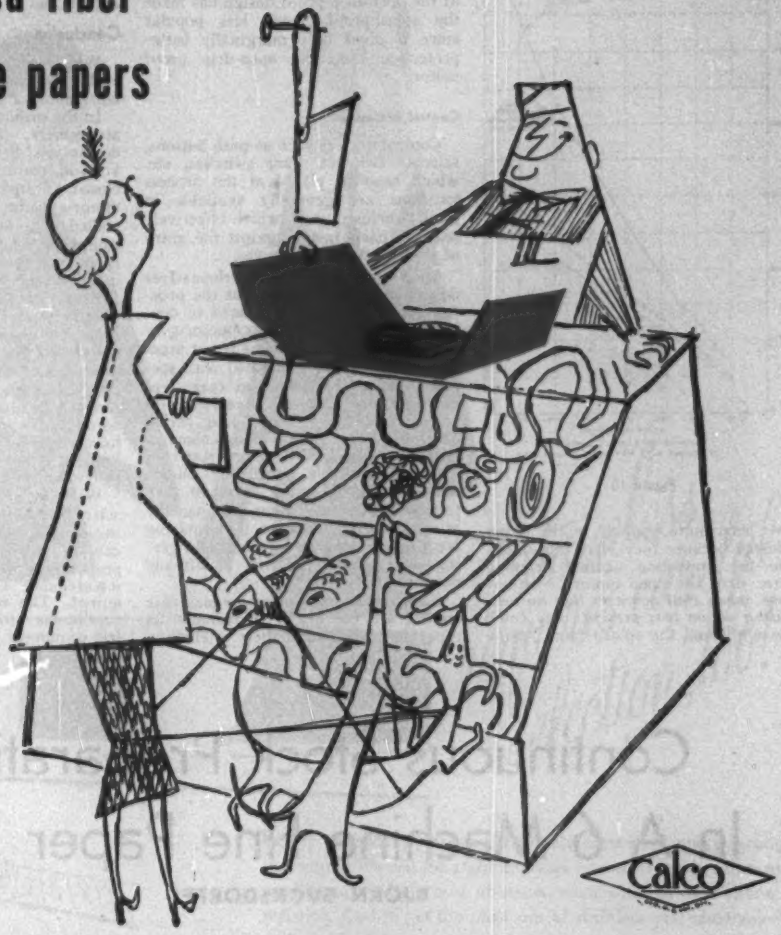


Figure 9—A 700-hp., 2300-Volt Totally Enclosed Induction Motor with an Air-To-Water Heat Exchanger Built in above the Motor, for an Induced Fan Drive in a Southeastern Mill.

for red fiber in granite papers



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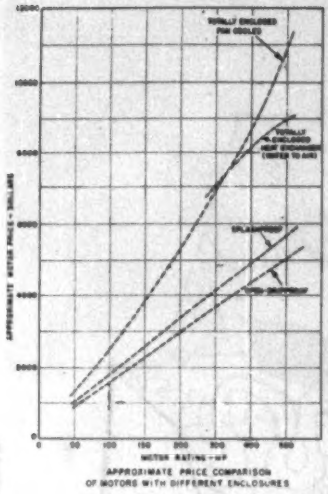
TOTALLY ENCLOSED FAN COOLED
TOTALLY ENCLOSED WATER ENCLOSED (WATER TO AIR)
SPLASHPROOF
OPEN DRIP PROOF
APPROXIMATE MOTOR PRICE - DOLLARS
MOTOR RATING - HP
APPROXIMATE PRICE COMPARISON OF MOTORS WITH DIFFERENT ENCLOSURES

Figure 10

have been quite popular in the paper industry because they were more suitable for protection against dripping water than the open motor. Furthermore, *when shut down so that no ventilating action was present*, they could also withstand the splash from hosing close by. However, the introduction of the open-drip proof design has made the splashproof motor less popular since it gives only marginally better protection than the open-drip proof motor.

Control Enclosures

Control devices such as push buttons, selector switches, limit switches, etc. which must be placed at the process locations are generally available in totally enclosed units, which effectively seal the parts inside against the entry of moisture and corrosives.

Magnetic control panels themselves do not have to be located at the process but usually can be placed in control rooms like switchgear, motor-generator sets, etc. When this is not practicable, they can be obtained with special enclosures to keep out corrosives and moisture quite effectively, except for some breathing over a long period of time. Some of the most common types (like a-c full voltage starters) are also available completely oil-immersed. The oil gives excellent protection against corrosion, but has the attendant disadvantages of requiring frequent filtering or renewal, and giving poor contact tip life, as already described.

Such special enclosures for magnetic control are not nearly so common as those for motors and their production is limited, making the cost relatively higher and delivery dates longer.

Conclusion

While local conditions vary considerably, we can make some general conclusions as a guide.

In the ordinary mildly corrosive mill atmosphere, standard equipment will do the job. When corrosive conditions are bad, motors should be suitably enclosed. Transformers, switchgear, and motor-generator sets should be installed in a protective room. Control equipment may be placed in such a room or at the process location depending on requirements.

Even in mildly corrosive atmospheres, it is common practice to use some motors in fully protective enclosures so that they can be transferred any place in the mill in case of emergency. In such atmospheres, control rooms may also be desirable for transformers, switchgear, etc. since they have supplementary advantages in keeping out unauthorized personnel, providing storage space, etc.

With the foregoing in mind when selecting equipment and planning an installation, the problem of corrosion can be reduced to very manageable proportions, where infrequent, periodic maintenance is all that will be required. The result will be maximum continuous production from the electric equipment and lower costs per ton.

Continuous Stock Preparation In A 6 Machine Fine Paper Plant*

BJORN SUCKSDORFF[1]

The well-known Finnish woodworking company Kymmene Akiebolag of the Kuusankoski county has successfully completed a rebuilding of the stock preparation plant of the Kymmene and Kuusankoski paper mills. These two mills, which formerly belonged to different companies amalgamated in 1904, are situated on the Kymmene river some 400 yards apart with a branch of the river between them. *(Figure 1)*. Up to the second world war the company operated a groundwood mill for better grade pulp on the Kuusankoski side and one for newspaper pulp on the Kymmene shore. During and after the war a new hydroelectric power station has been built, and the old Kuusankoski groundwood mill has thus been left without water and is scrapped. Two of the four four-

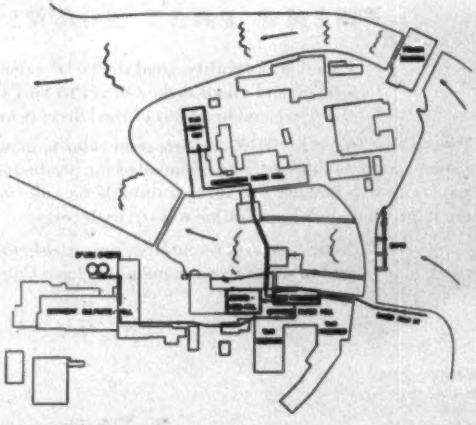

Figure 1.

* Reprinted from Paperi-ja Puu—Papper och Trä B No. 4a, 1950.

[1] *Björn Sucksdorff*, Head of the Technical Department of Kymmene Aktiebolag, Kuusankoski Finland.

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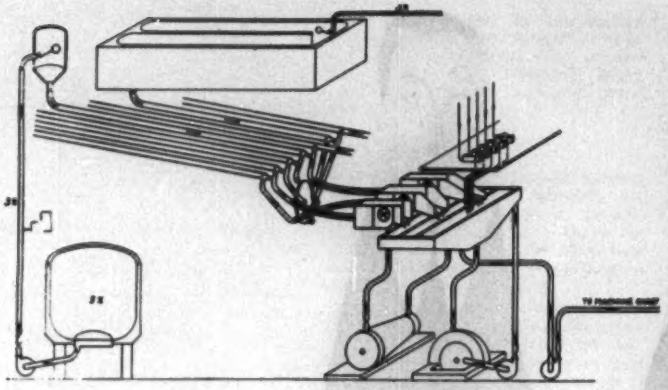


Figure 2.

driniers in the Kymmene paper mill used to make newsprint paper, but as the supply of groundwood was curtailed it was decided, to convert them into fine paper machines. The available beater house space was however not big enough to accommodate necessary stock preparation plant of conventional type, neither could the increased quantity of sulphite pulp be handled as wet laps as hitherto, and the company was therefore forced to look for a more modern solution.

In the Kymmene paper mill two 140″, one 100″ and one 90″ fourdrinier machines produce some 200 tons a day between them and in the Kuusankoski mill two 120″ Yankee machines produce some 30 tons a day. As in all European better grade mills the qualities and furnishes vary considerably, but as an average 80 tons of bl. sulphite, 60 tons of unbl. sulphite, 80 tons of groundwood and 10 tons of sulphate and special pulps are used per day. Of these quantities the groundwood is produced in the Kymmene groundwood mill and the bl. sulphite in the nearby Kymmene sulphite mill and could be supplied slush. The unbleached sulphite is manufactured in the company's sulphite mill at Woikka 3 miles further north and is brought to Kymmene by the company's narrow gauge railway in bales of 50 per cent consistency. Special pulps are supplied in bales of 50 to 90 per cent bone dry consistency.

Before the rebuilding, all pulp had to be brought to the Kuusankoski mill by rail and trucked and fed into the beaters by hand. In the Kymmene mill most of the mechanical pulp was dumped into the beaters but the rest, perhaps 25 per cent, and all of the chemical pulp was put in by hand. As the two biggest items, the bleached sulphite and the groundwood could be supplied slush to the Kymmene paper mill, it was decided to construct a stock preparation plant working entirely with slush pulps and continuously. Before this could be done, however, extensive investigations were made to prove that good results would be gained without hollander beaters. These trials were described by the author in an article in the Finnish Paper and Timber Journal 1947, No. 7A. As pumping of bleached sulphite from the sulphite mill to Kymmene paper mill resulted in big savings, because all the manhandling of wet laps could be eliminated, only if at the same time the stock preparation of the Kuusankoski paper mill was modernized, it was decided to incorporate stock proportioning devices for the Kuusankoski machines into the new Kymmene plant and pump the stock some 400 yards to the other mill.

Proportioning devices of known type could not be used in our case, because the available stock chests are situated either far away or overhead, so it is impossible to arrange a backfall from any meters. Furthermore, as we from the start counted on having not less than five standard pulps always available and on the top of that the possibility to furnish two not standard sorts, any system of backfall pipes would have been next to impossible to install. We therefore had to construct an entirely new type of proportioning devices made so, that the stock level behind the rotating cylinder can vary within reasonable limits without affecting the metering accuracy. When this was done, we constructed a float valve box behind the wheel made to work if the pressure behind the valve is not higher than about 15′. We could thus use our overhead chests for part of the pulps and float valve tanks on the same third floor as these chests for pulps pumped from far away positions *(Figure 2)*. There are no overflows and need not be any. The stockmeters are situated on the second floor under the chests and tanks and seven horizontal pipes are run under the roof, one from each chest or tank. The proportioning devices for our six machines are placed three and three abreast in two lines in the beater house formerly serving one machine only *(Figure 3)*. From each one of the seven main pipes under the roof branch pipes are run down to about breast height behind the proportioning devices of each machine and their open ends are fixed to a round frame. Shut off valves are built in every pipe as close to the main pipes as possible.

Each machine has three meters for pulp and anyone of these can be connected to anyone of the seven stock pipes by means of flexible rubber piping and quick-joints closing against

Figure 3.—Paper machine III proportioning devices in foreground. In the middle those for paper machine IV and in the background for paper machine V.

Figure 4.—Paper machine VI stockmeters and jordan-supply box. The pipes from dye and chemical-meters are clearly seen.

Figure 5.—Paper machine IX broke-, chemical- and dye meters. In the lower right corner the "dye-exchange" and in the upper left paper machine VIII devices.

the open ends of the branch pipes *(Figure 4)*.

The stockmeters are made in three different sizes for a daily production of 75, 50 and 25 tons respectively of bone dry pulp at a consistency of 3 per cent. Their construction is such, that the metering volume can be steplessly adjusted during operation by means of turnable wings. Each meter has a scale showing the set metering volume in per cent of the biggest volume of the biggest unit in the set of three meters. If for instance the readings are 60 + 25 + 15 = 100, the resp. pulps consist 60, 25 and 15 per cent of the total fibre, assuming that all consistencies are the same. The stock meters are driven from one shaft by means of chains and have dog clutches, so that idle ones can be stopped. The shaft again is given a variable speed either by using variable speed motors or cone pulleys and the total volume metered per time-unit can thus be regulated within very wide limits.

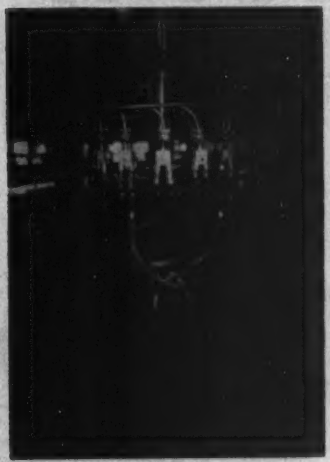


Figure 6.—The "dye-exchange" at the Kuusankoski m/l.

Clay, size, alum and dyes are proportioned with meters of a different construction. These meters are driven from a second shaft, which is chain driven from the main shaft and consequently their speed varies in the same proportion as that of the stock meters. These meters consist of small bucket wheels with removable buckets of different sizes. The metering volume can thus be very greatly and accurately varied by changing the number and size of the bucket in operation. On top of that the dye wheels have two different speeds, the slower being 1/10 of the normal. All these meters have float operating valves of needle type, so that overflow pipes are avoided. There is a number of tanks for standard dyes for shading purposes and a few smaller ones for special dyes and for use, when tinted papers are made. Each machine has four pipes, one from each dye meter, and all these pipes are run to a central place and end in rubber hoses, which at will can be connected to any one of the supply pipes from the dye tanks.

There is a separate clay mixer and storage tank for each machine and the clay meters are fed by gravity from resp. tanks. All alum meters are fed from a common pipe coming from one of two alum storage tanks. Two types of size are used. One contains only 4 per cent solids and is run by gravity to the size meters. The stronger size contains 20 per cent solids and is pumped in a pipe, from which the meters are fed, through the beater house and back into the storage tank. This is the only place where circulation is necessary to prevent pipes from clogging.

The far away Kuusankoski machines have their stock metering devices at Kymmene and the stock is diluted to 1½ per cent and pumped 400 yards through 4" pipes in about 7 minutes. At Kuusankoski the stock is thickened and broke, chemicals and dyes added in the same way as described above. The speeds of the two parts of meters for these machines are simultaneously altered in both ends *(Figures 5 and 6)*.

In our mills bleached strong sulphite is pumped 350 yards from the sulphite mill in an 8" eternite pipe at 2 per cent consistency. At the paper mill it is thickened to about 5 per cent and put into a 600 m³ chest. From here a pump lifts it to a float valve tank in the stock preparation department and a consistency regulator dilutes the stock to 3 per cent. Bleached, soft sulphite is supplied in bales and these are pulped

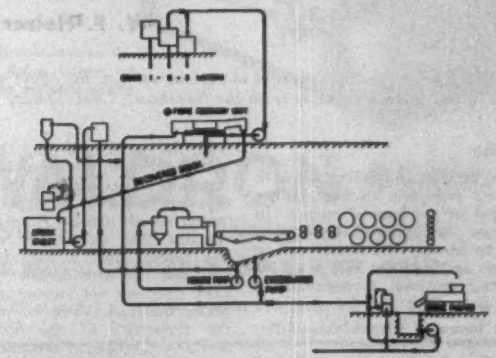


Figure 7.

in a continuously operating hydrapulper, from which the pulp is pumped to another float valve tank. A regulator keeps the consistency at 3 per cent. Unbleached pulp is treated exactly as above in a second hydrapulper. Unbleached groundwood will be put through screw presses, diluted to 5 per cent with paper mill water, pumped to a 300 m³ storage chest and thence to a float valve tank at 3 per cent consistency as above. Bleached groundwood from the screw presses is diluted to 3 per cent consistency and then pumped to one of the overhead chests. There is one more big hydrapulper, which can be used for sulphate, for special pulps or batches of tinted broke. To this pulper is connected a continuous beater, in which hard pulps can be prebeaten or broke cleared and the stock is pumped to an overhead chest at 3 per cent consistency. The two 140" machines have in their basements one wurster-type pulper each. From these the broke is pumped at 3 per cent to two overhead chests. For the broke from the smaller machines we have two smaller hydrapulpers pumping to two small overhead chests. Each of the Kuusankoski machines has a wurster-pulper and a broke chest.

It is of paramount importance in paper making that the raw materials do not vary, so that a constant stream of equally mixed and beaten pulp can be fed to the machines. This can be done by keeping big quantities of stock in circulation after the mixing, or by properly blending stocks of unchanging quality and consistency just before the machine. In the second case only small quantities of blended stock need to be held in the machine chest and changes are easy and quick. In a mill making frequent changes this method is by far preferred. Our experience has been, that when using beaters and batches in general, the human element is the greatest source of errors and variations particularly when changing shifts and orders. Our continuous system has in this respect been far superior to the old, takes less room and saved close to one hundred workers between the paper mills and pulp mills.

Every paper maker knows that different pulps need different beating and different papers with different properties, different treatment. However nearly all fine paper mills still beat their stock mixtures as one pulp. In most cases this is perhaps good enough, but if the different characteristics of the blended pulps are to be developed to greatest advantage, it is not enough. Each machine has two beating engines; the bigger machines two jordans each and the smaller ones a jordan and a Milne refiner each. The stock meters deliver to anyone of three compartments in a refiner head box of which the first is connected to the first beating engine, always a jordan, the second to the second engine, jordan or refiner and the third to a pump pumping to the machine chest. The stock in the jordans can be recirculated or taken straight through at will and delivered back to any one of the head box compartments. The refiners do not pump and the stock from them is fed to the pump. If for instance a paper containing kraft, sulphite and groundwood is made, the kraft can be taken to engine 1 and recirculated, the prebeaten kraft and the sulphite together to engine 2 and the mechanical pulp left without any beating. Also, clay, size, alum and dyes can be added to any compartment. The beating engines are all placed together on the first floor under the proportioning devices.

It is obvious that more than two engines can be used if necessary and that best results can be gained if the machines are chosen so, that hydration and cutting can be done at will. A combination of a hydrafiner, a jordan and a Milne refiner for instance would give the beaterman an ideal choice.

As can be gathered from the above, the fibre recovery and back water problem in our mill is rather complicated. It is indeed and we solve it as follows *(Figure 3)*. All old sedimentation tanks will be used for other purposes. Each machine has a recovery unit working on the principle of either flotation or filtration and the recovered stock is returned to the paper machine. The cleaned waters are pumped to three supply tanks, one for water from the sulphite thickeners, one for woodfree water and one for mechanical waters. The different waters will be used in spray pipes, in cellulose pulpers and consistency regulators and for diluting groundwood after screw presses and in consistency regulators respectively. When making tinted papers the cleaned waters are discarded. As make-up water in the tanks water of higher quality or fresh water is used.

The new stock preparation plant described above is quite unorthodox in many respects. It is a departure from old worn-out customs and our special circumstances have necessitated such a drastic step. However, the plant has in practice proved its superiority and it is hoped that the principles may be useful to mills wanting to modernize.

Relation Between Wood and Pulp Properties*

W. F. Holzer[1]

The fiber properties inherent in various species, the effect of decay on pulp quality, and the characteristics of the pulps obtainable from the Northeast, Lake States, South, and Pacific Northwest are described.

Introduction

The first step in converting wood to paper is its reduction to fiber, either by chemical or mechanical means. In the first case the lignin of the wood is dissolved to liberate the fibers, and in the process much of the less resistant carbohydrate material is removed as well. In the second case the wood is literally torn to pieces, and the resulting pulp contains all of the wood except the water soluble portions. No matter which process is used, the fact remains that pulping is subtractive. We cannot make a pulp from wood, and end up with a fiber possessing some property not stemming from the parent material. True, we may control the properties of the fibers within limits by the type of treatment we use, but the final qualities are always inferior to the potential qualities in the original wood. From this the importance of the wood properties becomes obvious.

Both physical and chemical properties of the fibers in wood are important. In the first group the physical dimensions of the fiber, length, breadth, and wall thickness, and the crystallinity of the cellulose have significant bearing on pulp properties. The type and amount of hemicelluloses, coloring matters, and extraneous materials in

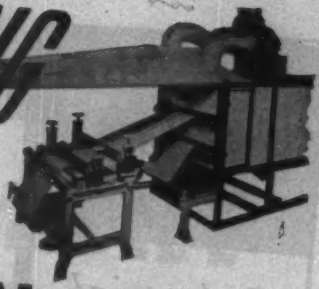
(Continued on page 40)

[1] Assistant Director of Research, Crown Zellerbach Corp., Camas, Wash.

* Presented at the Fourth Annual National Meeting of the Forest Products Research Society at Portland, Ore.

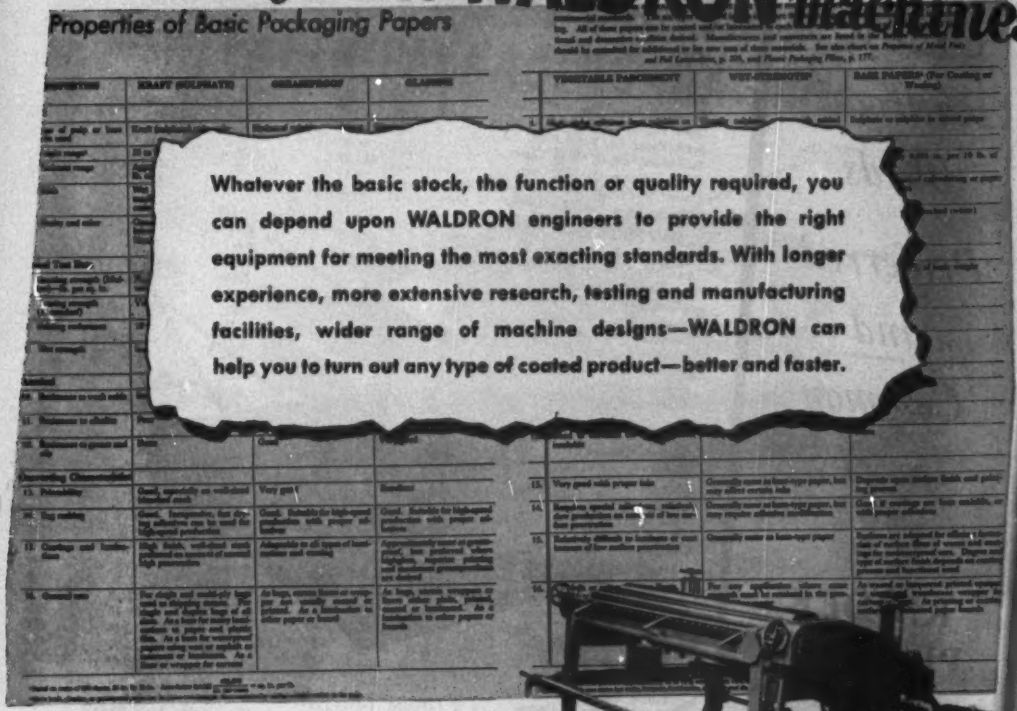
Specialty COATING

GREASE PROOFING – MOISTURE RESISTING – WATERPROOFING
MOLD RESISTING – REINFORCING – DECORATING, ETC.



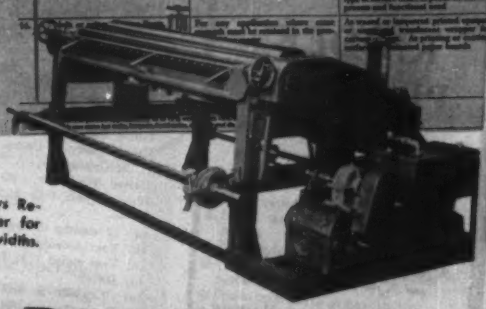
is a job for WALDRON machines

Properties of Basic Packaging Papers



Whatever the basic stock, the function or quality required, you can depend upon WALDRON engineers to provide the right equipment for meeting the most exacting standards. With longer experience, more extensive research, testing and manufacturing facilities, wider range of machine designs—WALDRON can help you to turn out any type of coated product—better and faster.

Chart reproduced thru courtesy Modern Packaging Encyclopedia 1950.



Waldron-Meadows Reverse Roller Coater for varying material widths.

Coating Machines
Creasing Machines
Embossing Machines
Floor Cov. Machines
Gumming Machines
Laminating Machines
Printing Machines
Rubber Mill Machines
Wall Paper Machines
Waxing Machines
Winders and Slitters
Special Design Machines

JOHN WALDRON CORP.

WALDRON DIVISION • MEADOWS DIVISION

Main Office & Works: NEW BRUNSWICK, NEW JERSEY

BUILDERS OF QUALITY MACHINES SINCE 1827

UNDERWRITERS
DEALERS
BROKERS

Industrial, Utility, Railroad Bonds Preferred and Common Stocks

•

KIDDER, PEABODY & CO.

Founded 1865

Members
New York and Boston Stock Exchanges and New York Curb Exchange

NEW YORK · BOSTON
PHILADELPHIA · CHICAGO

Sales and Branch Offices

Albany · Newport
Altoona · Providence
Baltimore · Reading
Lowell · Scranton
Minneapolis · Springfield
New Bedford · Wilkes-Barre

New York Teletype NY 1-193

Financial News

STOCK REPORT

	Per Share Earnings Calendar Year 1949	Per Share Earnings 12 Mo. to Approx. 9/30/50	Indic. Annual Divid. Rate	Jan. 17 Approx. Market Price
PREFERRED STOCKS				
Armstrong Cork Co. $3.75 Cum.	$40.95*	$48.14a	$3.75	$102½
Armstrong Cork Co. $4.00 Cum Conv.	40.95*	48.14a	4.00	117
Celotex Corp. 5% Cum.	6.80c	11.70c	1.00	16⅜
Champion Paper & Fibre $4.50 Cum.	60.09f	97.99	4.50	105½
Container Corp. of Amer. 4% Cum.	89.52	122.92	4.00	105⅜
Crown Zellerbach $4.20 Cum.	54.38c	66.87	4.20	104
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	10.93	13.70	2.50	51½
Flintkote Co. $4 Cum.	62.70	79.70	4.00	105¼
Robert Gair Co., Inc. 6% Cum.	13.79†	17.21†	1.20	19¾
International Paper Co. $4 Cum.	224.55	323.40	4.00	108¾
Kimberly Clark Corp. 4% Cum.	85.27	124.87c	4.50	106⅜
MacAndrews & Forbes 6% Cum.	61.59	63.03	6.00	140
Mead Corp. 4¼% Cum.	51.37	88.30	4.25	94
Mead Corp. 2% Cum. Conv. 2nd	21.35*	36.20*	2.00	61½
Pabco Products, Inc. 4% Cum. Conv.	56.46	124.88	4.00	98
Rayonier Inc. $2 Cum.	9.54	17.45	2.00	36⅛
St. Regis Paper Co. 4.40% 1st A	30.74	52.38	4.40	96
Scott Paper Co. $3.40 Cum.	51.15*	62.16*	3.40	101¼
Scott Paper Co. $4.00 Cum.	51.15*	62.16*	4.00	106½
Sutherland Paper 4¼% Conv.	46.92	68.59	4.25	115½
U. S. Gypsum Co. 7% Cum.	283.37	429.37	7.00	183
United Wallpaper Inc. 4% Cum. Conv.	2.14	(d)17.15	2.00	24⅝
West Virginia Pulp & Paper 4½% Cum.	61.28c	92.91c	4.50	110½
COMMON STOCKS				
APW Products Co.	(d)0.81	0.45	—	7
American Writing Paper Corp.	.04	0.86	0.50	8⅛
Armstrong Cork Co.	6.57	7.84a	3.75	50¼
Celotex Corp.	1.65c	3.03c	1.00	16¾
Certain-Teed Prods. Corp.	2.84	3.43	1.50	15⅜
Champion Paper & Fibre	5.15f	8.93	2.45	46⅝
Congoleum Nairn Co.	3.04	2.70a	2.00	24⅜
Container Corp. of America	4.23	5.14	2.50	34⅜
Crown-Zellerbach	6.02e	7.36	2.20	49⅛
Dixie Cup Co.	7.4c	9.87	1.50	45⅛
Eastern Corp.	0.04	3.04	1.00	19⅜
Flintkote Co.	4.33	5.48	3.00	26⅜
Robert Gair Co., Inc.	2.11†	2.69†	0.70	12⅜
Great Northern Paper Co.	4.87	3.73	3.00	47½
International Paper Co.	7.12	8.65	2.50	54⅛
Johns-Manville Corp.	4.83	6.38	3.50	49⅜
Kimberly Clark Corp.	5.29	6.81c	1.80	44⅜
MacAndrews & Forbes Co.	3.64	3.74	3.00	39⅛
Marathon Corp.	3.39c	4.84c	1.40	38⅛
Mead Corp.	4.10	7.32	2.20	24⅜
National Container Corp.	0.93	2.00	0.75	11⅜
Pabco Products, Inc.	0.85	1.95	0.60	18⅛
Rayonier, Inc.	4.75	9.73	2.50	53¼
Ruberoid Co.	7.93	8.65	3.18	49⅛
St. Regis Paper Co.	0.91	1.63	0.60	12½
Scott Paper Co.	6.87	7.12	3.60	42⅜
Sutherland Paper Co.	4.82	6.47	2.75	45½
Union Bag & Paper Corp.	5.01	6.68	3.00	39⅜
United Board & Carton	(d)1.61b	1.56g	0.50	18¼
U. S. Gypsum Co.	13.51	17.87	10.00	106
United Wallpaper	(d)0.01	(d)0.57	—	3⅜
West Virginia Pulp & Paper	8.58c	12.93e	5.00	82½

(a) 12 months to approximately 6/30/50
(b) Year ended 11/13/49
(c) Year ended 1/31/50
(d) Deficit
(e) 12 months to 10/31/50
(f) 9 months to 12/31/49
(g) 12 months to 11/11/50
(*) Earnings per combined preferred shares
(†) Includes domestic and Canadian subsidiaries and 60% equity in Southern Paperboard Corp.

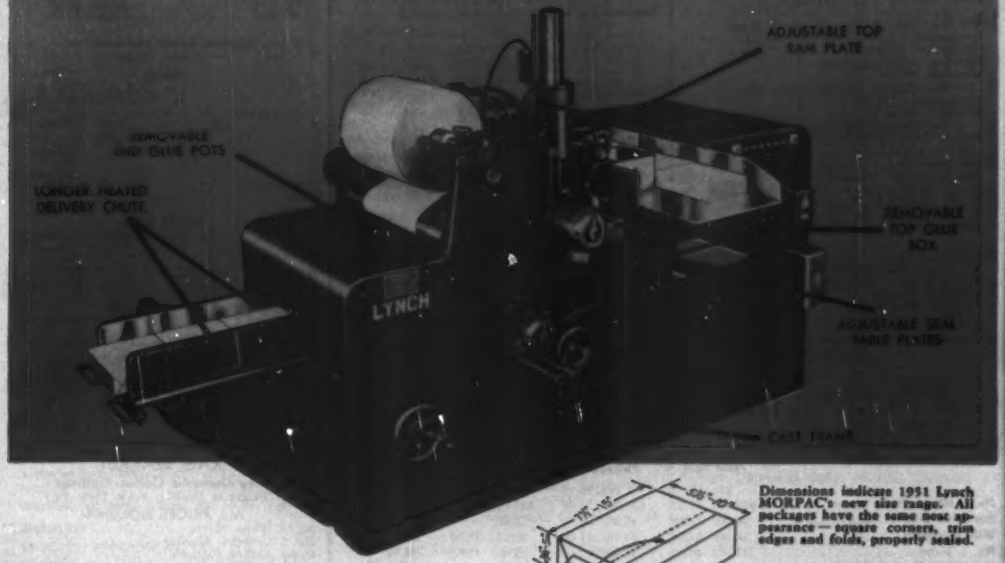
Robert Gair Co., Inc., New York, announced on December 29 the completion of a financing program whereby the funded debt of the parent company, which on December 31, 1949, totaled slightly under $10 million, has been paid off as of that date.

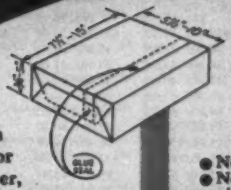
This was effected by cash payments of approximately $3 million and through the sale to The Mutual Life Insurance Co. of New York of $7 million first mortgage bonds of the Southern Paperboard Corp., maturing in 1970, and carrying a 3⅜ percent interest rate. Southern Paperboard Corp. is a subsidiary of the Robert Gair Co., Inc.

The funds thus provided in this financing permitted Gair to retire $6,583,000 of Robert Gair Co., Inc., 3½ percent notes maturing in 1966 held by The Mutual Life Insurance Co. and $2,540,000 of short term notes held by the First National Bank of Boston.

New Package Sizes... New Features with

THE ALL-NEW 1951 MODEL E LYNCH MORPAC PAPER PACKAGING MACHINE





Dimensions indicate 1951 Lynch MORPAC's new size range. All packages have the same neat appearance — square corners, trim edges and folds, properly sealed.

Just developed by Lynch Engineers is the "All-New 1951 Model E Lynch MORPAC Paper Packaging Machine". It wraps or bands and seals with liquid adhesive ream paper, pads, tablets, loose leaf fillers, bound books, etc., at speeds up to 1,000 units per hour, saving 30% to 40% in wrapper material. Electrically controlled and air operated, it requires only one operator for feeding. On an average operation, it pays for itself in a surprisingly short time. Write for details on how Lynch MORPAC Model E can reduce your packaging costs.

FEATURES:

- New removable glue pots
- New adjustable seal table plates
- New additional heat sealing
- New simplified adjustment settings
- New complete accessibility
- New cast frame
- New electrical and mechanical refinements throughout
- New size range; Min. 5⅛ x 7⅛ x ¾"; Max. 10 x 15 x 3"
- 15 minute max. time for size change

PAR AIR COMPRESSORS

PAR REFRIGERATION COMPRESSORS

WRAP-O-MATIC CANDY & COOKIE WRAPPING MACHINES

LYNCH CORPORATION
PACKAGING MACHINE DIVISION
TOLEDO, OHIO

PAPER PACKAGING MACHINES

MORPAC BUTTER & OLEO CARTONING MACHINES

GLASS FORMING MACHINES

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Most orders accepted, however, at price prevailing on date of shipment. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton $105.00/110.00
Sheets .....
F.o.b. Mills. C.l. Frt. allowed, dock, N. Y.

Kraft— pr cwt., 40# base wgt.

Standard Wrapping Rolls	$7.75/ —
No. 1 Wrapping Rolls	8.25/ 8.50
Standard Bag	7.50/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd.	$1.85 /$2.50
Wh. No. 1 MG	1.85 / —
Wh. No. 1½	1.75 / —
Wh. No. 2	1.65 / —
Kraft Non-Tar	1.70 / —
White Non-Tar	

Toilet— per case of 100 rolls—1 M sheets

Unbleached 4½x4½	$8.00/$8.25
Unbleached 4½x5	6.05/ —
Bleached 4½x4½	7.10/ 8.80
Bleached 4½x5	9.10/ —
Per Case of 50 rolls—2000 sheets	
Unbleached 4½x4½	$8.00/$8.25
Bleached 4½x4½	6.95/ —
Per Case of 100 rolls—1000 sheets	
Facial, 4½x5, 2 ply	$8.95/$9.85

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9¼x9¼	$5.65
Br. Sr. M'tif'd 10x12	4.00
Br. Jr. M'tif'd 9½x9¾	3.50
Br. Jr. Sgl. fold 10x10¼	3.35
Bichd. 7¾x11, 24/25 rolls	$6.00/7.00

Manila, per cwt.

No. 1 Jute Tag sheets*	$16.55/18.55
Reg. Jute M.F. 40-lb., sheets*	15.00/17.00
Wrapping Manila	8.75/ 10.50
Printing Manila	10.50/12.00

* Less usual allowance for rolls.

WORLD WOOD PULP MARKETS

Fourth Quarter Contract Prices, Per Short Air-Dry Ton

Varying freight allowances — Atlantic Ports

	U. S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$85.00/100.00	$85.00/100.00			
Sulphate, Bleached	135.00/200.00	175.00/ —	*180.00/187.00†		Competitive
Sulphate, Unbl. Northn.		147.50/155.00	*153.00/185.00*		
Sulphate, Unbl. Southn.					
Sulphite, Bichd. (Sftwd.)	135.00/165.00	145.00/ —	*175.00/ —	Competitive	Competitive
Sulfite, Bichd. (Hdwd.)	150.00/175.00				
Sulphite, Unbichd.	132.50/150.00	132.50/150.00	*153.00/165.00		
Sulphite, Unbl'd (Glassine)		143.00/146.50	*157.00/ —		
Soda, Bichd.	140.00/142.50	140.00/142.50			

* On dock. † Delivered.

Gummed Tape—per bdl., 500 bdls. or more

90-lb. 375 ft. GSI	$6.90 / —
60-lb. 600 ft. GSI	6.90 / —
35-lb. 800 ft. GSI	7.93½/ —
35-lb. 500 ft. GSO	5.98 / —

Boards, per ton—

Filled News	$102.50/107.50
Plain Chip	105.00/107.50
Bichd. Mis. L-d. Chip	132.50/147.50
White Pat. coated .020	155.00/170.00
Kraft Liners 42 lb.	115.00/117.50
Kraft Corr. .009	122.50/126.00
Binders Boards	137.50/140.00

The following prices are representative distributors' resale prices.

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$70.45/ —
100% Rag	62.45/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ —
25% Rag	29.75/ 30.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$72.65/ —
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ —

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$19.05/$19.85
Plain	18.05/ —

Ledgers	4 Ctns.
	per cwt.
Watermarked	$21.15/ —
Plain	19.35/ —

White Book

Conversion Coated	Case
	per cwt.
No. 1	$23.40/$24.65
No. 2	21.90/ 23.40
No. 3	21.15/ 22.40
Machine Coated	
No. 1	$18.15/ —
No. 2	16.15/ —
Uncoated	
No. 1 Antique (Watermarked)	$19.15/ —
Offset	17.90/ —
A Grade E. F.	17.40/ 18.15
A Grade S. C.	18.15/ 18.65
B Grade E. F.	17.65/ —
B Grade S. C.	18.40/ —

‡ Indicates a price change.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) ALL PRICES NOMINAL. SPOT OFFERINGS OR SPECIAL PACKINGS NOT INCLUDED.

	New York	Philadelphia	Boston	Chicago
	Jan. 17.	Jan. 16	Jan. 6	Jan.4
No. 1 Mixed Paper	$32.00/ 35.00	$32.00/ 35.00	$29.00/ —	$33.00/ —
Boxboard Cuts	30.00/ 33.00	30.00/ 33.00	26.00/ —	38.00/ —
Mill Wrappers	30.00/ 35.00	30.00/ 35.00	30.00/ 35.00	35.00/ —
No. 1 News	37.00/ 40.00	33.00/ 40.00	33.00/ 35.00	38.00/ —
Over-issue News	40.00/ 45.00	40.00/ —	33.00/ 45.00	41.00/ —
Corrugated Containers	64.00/ 69.00	55.00/ 62.00	49.00/ 65.00	52.00/ —
New Corrugated Cuts	55.00/ 62.00	55.00/ 60.00	55.00/ 65.00	62.00/ —
Double Kraft Ld. Corr. Cuts	115.00/120.00	105.00/110.00	120.00/130.00	120.00/ —
100% Kraft Corr. Cuts	125.00/140.00	125.00/135.00	130.00/150.00	135.00/ —
Used Kraft Bags	85.00/ 95.00	80.00/ 85.00	85.00/ 95.00	65.00/ —
No. 1 Brown Kraft Paper	90.00/ 95.00	90.00/ 95.00	90.00/110.00	65.00/ —
Super Resorted Br. Kraft	100.00/105.00	100.00/105.00	100.00/125.00	90.00/ —
New Br. Kraft Env. Cuts	160.00/175.00	160.00/175.00	160.00/180.00	150.00/ —
New Br. Kraft Cuts	150.00/180.00	130.00/135.00	150.00/180.00	140.00/ —
No. 1 Gdwd Shvs.	80.00/ 85.00	75.00/ 80.00	80.00/ 85.00	75.00/ —
White Newsblanks	115.00/125.00	110.00/115.00	110.00/120.00	115.00/ —
No. 1 Flyleaf Shvs.	80.00/ 85.00	90.00/ 95.00	95.00/105.00	110.00/ —
No. 1 Soft Wht. Shvs.	180.00/190.00	170.00/175.00	175.00/195.00	175.00/ —
Super Soft Wht. Shvs.	190.00/200.00	190.00/200.00	190.00/200.00	185.00/ —
Hd. Wht. Shvs.	185.00/205.00	200.00/215.00	190.00/215.00	180.00/ —
Hd. Wht. Env. Cuts	200.00/235.00	225.00/ —	200.00/235.00	190.00/ —
New Manila Env. Cuts	140.00/150.00	160.00/165.00	140.00/165.00	115.00/ —
Col. Tab Cards	110.00/120.00	115.00/120.00	95.00/135.00	100.00/ —
Manila Tab Cards	160.00/170.00	165.00/175.00	160.00/200.00	165.00/ —
No. 1 Mixed Ledger	100.00/105.00	100.00/105.00	90.00/105.00	100.00/ —
White Ledger	125.00/135.00	125.00/130.00	125.00/140.00	125.00/ —
No. 1 Book & Mag.†	55.00/ 60.00	40.00/ 45.00	40.00/ 60.00	35.00/ —
No. 1 Rep'd. Hvy. Books‡	65.00/ 70.00	50.00/ 60.00	60.00/ 75.00	54.00/ —

* Delivered. † Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

No. 1 White Shirts	$19.00/$20.00
No. 1 Unbichd. Muslins	19.00/ 20.00
Bichd. Canton Flannels	16.00/ 17.50
No. 1 Lt. Silesias	12.00/ 13.00
No. 1 Lt. Prints	9.00/ 10.00
Wht. Bk. Blue Overalls (Bichable)	13.00/ 13.50
No. 1 Blue Overalls	7.00/ 9.00
Fancy Shirts	6.00/ 6.50
No. 1 Washables	5.00/ 5.50
Spartan Khaki Cuts	9.00/ —
Mixed Khaki Cuts	7.00/ 8.00
Corduroy Cuts	4.75/ 5.25
Cottonades	4.50/ 5.00
Bichd. Underwear Cuts	20.00/ 21.00
Unbichd. Underwear Cuts	19.00/ 20.00

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

	Per 100 lbs.
Mixed White	$4.50/$5.00
Cotton Pants & Overalls	3.75/ 4.25
Thirds and Blues, Repacked	3.50/ 3.75
No. 1 Roofing Rags	2.40/ 2.50
No. 2 Roofing Rags	2.30/ 2.40
No. 3 & 4 Roofing Rags	2.20/ 2.30
Roofing Bagging	2.20/ 2.30

New Foreign Cotton Cuttings
(Prices to Mills, F.o.b. Dock, N.Y.)

	Per 100 lbs.
New Dark Cuttings	$4.25/$4.75
New Mixed Cuttings	4.50/ 5.00
Light Silesias	7.50/ 8.00
Light Flannelettes	7.50/ 8.00
New White Cuttings	nominal
New Unbleached Cuttings	nominal
Fancy Shirt Cuttings	6.00/ 7.00

Light Prints	6.00/ 7.00
Bleachable Khaki, No. 1	5.50/ 6.00
Unbl. Khaki, No. 1	4.50/ 5.00

Old Foreign Rags

(Prices to Mills, f.o.b. Dock, N. Y.)

	Per 100 lbs.
No. 1 White Cottons	$6.50/$7.50
No. 2 White Cottons	5.50/ 6.00
No. 3 White Cottons	4.00/ 4.50
No. 4 White Cottons	3.50/ 3.75
Extra Light Prints	4.50/ 5.00
Old Light Prints	4.00/ 4.25
Med. Light Prints	3.50/ 3.75
Dutch Blue Cottons	3.75/ 4.00
Checks and Blue	3.00/ 3.50
Linsey Garments	2.75/ 3.00
Dark Cottons, European	2.25/ 2.50
Dark Cottons, Egyptian	2.15/ 2.30
Old Shoppertes	2.10/ 2.25
New Shoppertes	2.25/ 2.50

Bagging

(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$7.00/$8.00
Domestic Gunny, No. 1	6.75/ 7.25
Heavy Wool Tares	6.75/ 7.50
Foreign Manila Rope	4.25/ 4.50
Domestic Manila Rope	5.75/ 6.50
Jute Strings	6.25/ 6.50
No. 1 Sisal Strings	4.50/ 5.50
Mixed Strings	nominal
Paper Mill Tares	5.25/ 5.75
No. 1 Scrap Burlap	
Foreign	5.00/ 6.50
Domestic	6.00/ 7.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

MATERIALS

Aluminum, sulfate:
comm. bags, wks.....cwt. 1.65
iron-free c.l. 3.35

Alcohol, ethyl:
tax free, drms. c.l.....gal. .77 / 1.02
dnld. East Miss.

Alcohol, methyl:
Synthetic, Zone 1, drms.
c.l. fit. nild.....gal. .44

Casein, acid-prec.:
dom. sh. pt. c.l.....lb. .41 / .44½
imp. ex dock.....lb. .40½/ .41½

Caustic soda:
c.l. wks. solid, 76%, cwt..... 3.35
flak. & grd. 100-lb. drums... 3.75
liquid 50% tanks.... 2.55
liquid 70% tanks.... 2.65

China clay:
dom. air-float. filler, c.l. wks.
ton 10.00
water-washed, lump, filler.... 11.00
coating ..... 17.60 /30.50
imported, ex whse...short ton 15.50 /22.35

Chlorine:
single-unit tanks, works..cwt. 2.70
multi-unit .....cwt. 3.30 / 4.40

Formaldehyde:
USP, inh. drms, c.l. wks....lb. .0600/ .0625
l.c.l. E. wks..... .0650/ .0675

Fuel oil:
Bunker C, No. 6 Cal. hvy
tanks, refinery .....bbl. 1.95 / 2.15
light .....bbl. 2.05 / 2.10

Hydrogen peroxide:
USP, 35% cbys. E. of Miss.
lb. .24½/ .25½

Lime:
hydrated, bags, wks. Buffalo
ton 13.50

Rosin:
B gum, drms, c.l. Savan..cwt. 8.00
G, H, I, K.....cwt. 8.79
FF, wood, do. .....cwt. 7.30

Rosin size:
70%, gum & pale grds, tank
cars, south, sh. pt. ....cwt. 6.80 / 7.00

Salt cake:
dom. bulk, c.l. wks.....ton 17.00
wks. frt. all.....ton 20.00 /22.00

Soda ash:
light, 58%, bags, wks..... 1.50
bulk .....cwt. 1.30

Sodium silicate 40°:
turbid, c.l. wks.....cwt. 1.20
l.c.l. wks. ..... 1.35 / 1.95

Sodium peroxide:
dms. c.l. E. of Miss.....lb. .19
l.c.l. do. .....lb. .19½/ .20

Soybean, protein:
chem. isol, wks. c.l..... ..lb. .34 / —
Cinn. and Chic.

Sulfuric acid:
60° Be. cbys. cl. wks.... cwt. 1.75 / —
l.c.l. wks. .....cwt. 2.05 / 2.40

Sulfur:
crude, c.l. mines, contract,
long ton 21.00 /22.00
f.o.b vessels Gulf .... 22.50 /23.50
Export, f.o.b. Gulf..... 23.00

Sulfur dioxide:
liquid, comm. cyl. wks.....lb. .09
multi-unit cars .....lb. .0535

Starches:
pearl corn, bags, c.l. wks...cwt. 5.92 / —
white dextrines, c.l. wks..cwt. 7.29 / —
potato, Idaho, c.l. wks....cwt. 5.50 / —
potato, Maine, c.l. wks....cwt. 5.25 / —
tapioca, crmy. dextrines...cwt. 7.50 / 8.00
medium grds. Gulf and East
Coast ports ..... 6.75 / 7.50
low, Siam, on dock N. Y..... 5.00 / 5.50
nominal

Talc:
domestic, 50-lb. sacks, c.l.
wks. .....ton 25.00 /30.00

Titanium dioxide:
anastase, c.l. dnld., bags....lb. .21 / .21½
l.c.l. dnld. .....lb. .22 / .22½
rutile, c.l. dnld. .....lb. .23 / .23½
l.c.l. dnld. .....lb. .24 / .24½

N.B.: For special market conditions, see *Trends*.

IMPORTS

IMPORTS AT NEW YORK

Week Ending Jan. 13

Newsprint

N. Y. World Telegram, Cornerbrook, Cornerbrook, 1669 rolls.
N. Y. Herald Tribune, Cornerbrook, Cornerbrook, 808 rolls.
Gilman Paper Co., Cornerbrook, Cornerbrook, 86 rolls.
Wall Street Journal, Cornerbrook, Cornerbrook, 464 rolls.
Hearst Enterprises, Inc., Cornerbrook, Cornerbrook, 415 rolls.
Bato Co., Cornerbrook, Cornerbrook, 164 rolls.
The Upson Co., Cornerbrook, Cornerbrook, 306 rolls.
Madden Reeve Angel & Co., Inc., Krageholm, Kotka, 753 rolls.
N. Y. Journal American, Markland, Liverpool, N.S., 538 rolls.
N. Y. Daily Mirror, Markland, Liverpool, N.S., 180 rolls.
Buffalo Color Press, Markland, Liverpool, N.S., 248 rolls.
Brooklyn Eagle, Inc., Markland, Liverpool, N.S., 298 rolls.
Herald Statesman, Inc., Markland, Liverpool, N.S., 28 rolls.
Brooklyn Eagle Press, Markland, Liverpool, N.S., 49 rolls.
N. Y. Times, Markland, Liverpool, N.S., 148 rolls.
Trade Union Service, Markland, Liverpool, N.S., 141 rolls.
W. D. Peck, Inc., Markland, Liverpool, N.S., 146 rolls.
Washington Post, (Alexandria, Va.), Markland, Liverpool, N.S., 2721 rolls.
Alexandria Gazette, (Alexandria, Va.), Markland, Liverpool, N.S., 72 rolls.
Washington Daily News, (Alexandria, Va.), Markland, Liverpool, N.S., 536 rolls.

Wallpaper

W.H.S. Lloyd & Co., American Reporter, Havre, 13 cs.
A. L. Diament & Co., American Reporter, Havre, 1 cs.
Intermaritime Forwarding Co., American Forwarder, Liverpool, 460 ctns.
C. A. Haynes & Co., American Forwarder, Liverpool, 100 ctns.
Intermaritime Forwarding Co., Parthia, Liverpool, 909 ctns.

Gummed Paper

B. F. Drakenfeld & Co., American Forwarder, Liverpool, 141 cs.
B. F. Drakenfeld & Co., Parthia, Liverpool, 52 cs.

Tissue Paper

G. Lippelgoes, American Forwarder, Liverpool, 2 cs.
B. F. Drakenfeld & Co., Parthia, Liverpool, 28 cs. (gauze carbonizing).

Fancy Paper

Downing & Co., American Reporter, Havre, 3 cs.

Cardboard

All Transport, Inc., American Reporter, Havre, 5 cs.

Drawing Paper

Lansen Naeve Corp., American Reporter, Havre, 23 cs.
Freedman & Slater, Wells City, Avonmouth, 2 cs.

Baryta Coated Paper

C. Happel, American Merchant, Hamburg, 2 cs.

Crepe Paper

Brundage Merchandise Co., Westerdam, Rotterdam, 27 cs.

Printing Paper

F. C. Strype, Westerdam, Rotterdam, 25 cs. (uncoated).
Oxford University Press, Parthia, Liverpool, 20 cs.

Serviettes

(———), Parthia, Liverpool, 10 cs.

Surface Coated Paper

Gevaert Co. of America, Jytte Skou, Antwerp, 15 cs.

Miscellaneous Paper

Coty, Inc., American Merchant, Havre, 4 cs.
Coty, Inc., Liberte, Havre, 3 cs.
Stevens Nelson Paper Corp., Trien Maersk, Kobe, 6 cs.

Rags, Baggings, Etc.

Southern Waste Co., Explorer, Cochin, 100 bls. old jute rags.
Madden Reeve Angel & Co., Inc., Krageholm, Kotka, 67 rolls paper waste.
Midwest Waste Materials Co., Millenter, Antwerp, 200 bls. scrap bagging, 1 bls. rags, 148 bls. jute waste, 50 bls. bagging, 12 bls. jute cuttings.
A. W. Fenton, Inc., Millenter, Antwerp, 11 bls. paperstock.
E. J. Lang, American Forwarder, Liverpool, 50 bls. old bagging.
Robbins Forwarding Co., American Forwarder, Liverpool, 43 bls. cotton rags.

National City Bank, Parthia, Liverpool, 226 bls. sisal waste.
A. Siegle Corp., Parthia, Liverpool, 167 bls. jute waste.
J. Cohen & Son, Parthia, Liverpool, 16 bls. new cuttings.
Sadler Corp., Wells City, Newport Mon, 102 bls. jute waste.
A. Siegle Corp., Wells City, Newport Mon, 131 bls. jute waste.
A. de Vries Trading Corp., Heina, Rouen, 61 bls. rags.
E. J. Keller Co., Inc., Heina, Rouen, 40 bls. rags.
Amicale Wool Service, Heina, Rouen, 50 bls. rags.
New England Waste Co., Exchequer, Cochin, 250 bls. rags.
(———), Ramore, Glasgow, 101 bls. bagging.
(———), Tor Head, Glasgow, 86 bls. paperstock, 671 bls. bagging.

Woodpulp

Perkins Goodwin & Co., Paraguay, Copenhagen, 1448 bls. sulphite pulp.
Pulp Sales Corp., Krageholm, Gothenburg, 38 bls. sulphite pulp.
Brown Bros. Harriman & Co., Averdyk, Hamburg, 1078 bls. perforated pulp.
Elof Hansson, Inc., Idefjord, Oslo, 1250 bls. moist mechanical pulp, 4100 bls. wet ground wood.

Woodpulp Boards

Jay Madden Corp., Krageholm, Kotka, 102 rolls.
Parsons & Whittemore, Inc., Krageholm, Gothenburg, 212 rolls, 73 bls.

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CORES
CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.
CORINTH, N. Y.

IMPORTS AT BOSTON

Week Ending Jan. 13

(———), Averdyk, Hamburg, 424 bags casein.
Stone & Downer Co., American Forwarder, Liverpool, 8 ctns. wallpaper.
Elliott Addressing Machine Co., Trien Maersk, Kobe, 17 cs. tengujo paper.
Swift & Sons, Averdyk, Antwerp, 12 pc. wrapping paper.
Krasnow Woolstock Co., Averdyk, Antwerp, 80 bls. jute rags.
(———), Averdyk, Hamburg, 171 bls. rags.

IMPORTS AT PHILADELPHIA

Week Ending Jan. 13

Gottesman & Co., Inc., Paraguay, Copenhagen, 5704 bls. sulphite pulp.
Cellulose Sales Co., Paraguay, Copenhagen, 1260 bls. sulphite pulp.
(———), Paraguay, Iggesund, 1844 bls. sulphite pulp, 4106 bls. sulphate pulp.
Jay Madden Corp., Krageholm, Kotka, 580 rolls newsprint, 79 rolls sulphate wrapping paper, 226 rolls sulphite wrapping paper.
E. J. Keller Co., Inc., Heina, Rouen, 382 bls. rags.
Elof Hansson, Inc., Idefjord, Oslo, 5050 bls. moist mechanical pulp, 4100 bls. wet ground wood.

IMPORTS AT BALTIMORE

Week Ending Jan. 13

Perkins Goodwin & Co., Paraguay, Copenhagen, 869 bls. sulphite pulp.
Cellulose Sales Co., Paraguay, Copenhagen, 1200 bls. sulphite pulp.
(———), Paraguay, Iggesund, 1225 bls. sulphite pulp, 1875 bls. sulphate pulp.
E. J. Keller Co., Inc., American Reporter, Havre, 45 bls. old dark cotton rags.
Jay Madden Corp., Krageholm, Gothenburg, 285 bls. sulphate wrapping paper, 266 rolls woodpulp boards.
E. J. Keller Co., Inc., American Merchant, Havre, 82 bls. cotton rags.

IMPORTS AT NORFOLK

Week Ending Jan. 13

F. P. Gaskell & Co., American Forwarder, Liverpool, 63 cs. coated paper.
(———), Averdyk, Hamburg, 42 bls. jute rags.
Middleton & Co., American Forwarder, Liverpool, 143 bls. jute waste bagging.

IMPORTS AT NEWPORT NEWS

Week Ending Jan. 13

Cellulose Sales Co., Paraguay, Copenhagen, 6180 bls. sulphite pulp.
Detroit Free Press, Heina, Rouen, 955 rolls newsprint.
Brown Bros. Harriman & Co., Averdyk, Hamburg, 417 bls. unbleached sulphite pulp.

FUNDS FOR TIMBER ROADS

WASHINGTON, D. C. — The Nation's system of timber access roads would be expanded and modernized under a bill introduced at the opening of the current session of Congress by Rep. Clair Engle, Dem., of California.

The bill calls for annual appropriation of $30 million beginning with the fiscal year June 30, 1951, for a 5-year period. In this time, the Interior and Agriculture Departments jointly would be required to survey and construct new roads, restore others, and maintain the system under their respective jurisdictions.

GRAPHIC ARTS COURSES

Five top men in graphic arts have been engaged to teach new courses at New York University's Center for the Graphic Industries beginning February 5, Sidney G. Roth, director of technical studies at the Division of General Education, sponsor of the Center, announced yesterday.

Added in response to student demand and at the suggestion of the twelve-man planning committee of industry leaders, the new courses and instructors are:

"Advertising Design," by Peter Piening, Tuesday.

"Layout Problems for Direct Mail and Advertising Printing," by Alexander Nesbitt, Monday, 8:10-9:55.

"Production Cost Estimating for Book and Magazine Publishers," conducted by Leonard Shatzkin, production manager, the Viking Press, Wednesday, 6:00-7:45.

"Workshop in Book Design," conducted by George Salter, art director, the American Mercury Publications, Thursday, 6:15-8:00.

"Problems of Magazine Production" conducted by Irving Simon, production manager, Macfadden Publications. Monday, 6:15-8:00.

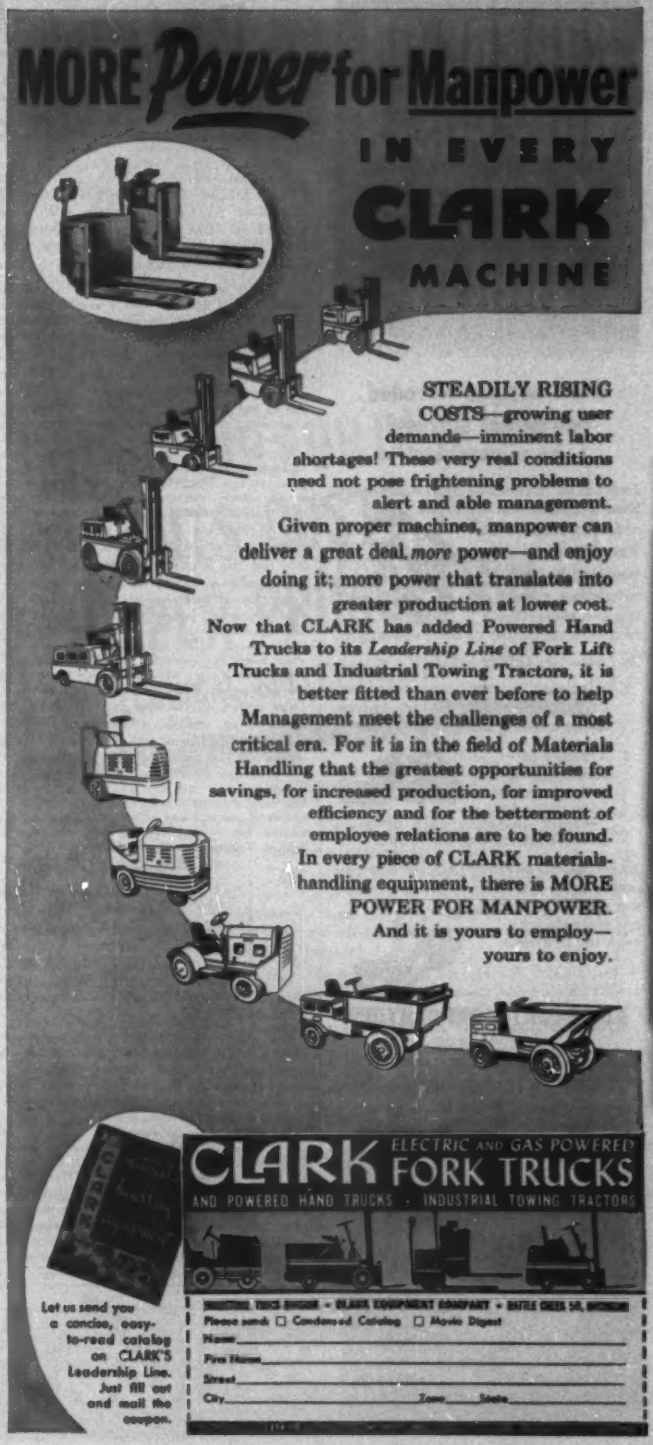
"Despite New York's leadership in the graphic industries, heretofore only limited opportunity for training has been available to craftsmen in the field," Professor Roth said. "Our spring term curriculum will include, in all, sixteen courses, each taught by an expert and usually well known worker in the graphic arts field."

Course titles for the spring semester are: Lithographic Processes and Materials," "Seminar in Ink and Paper in the Printing Process," "Book Editing," "Book Sales, Promotion and Advertising," "Treasure in Old Books," "Industrial Publicity," "Community Relations for Industry," "Calligraphy," "Basic Course in Printing Processes, Ink and Paper," and "Basic Course in Typography and Design."

Registration for these courses, most of which will meet at N.Y.U.'s Washington Square Center, may be made from January 22 through February 9. Further information may be obtained from Mr. Warren Bower, Division of General Education, New York University, Washington Square, New York 3, N. Y.

MARATHON CORP., Menasha, Wis., has announced the following executive promotions:

Emmett Below, who joined Marathon in 1934 and has been credit manager since 1942, was appointed controller, in charge of the company's accounting activities. Melvin Nield, assistant credit manager since 1947, was appointed credit manager. As credit manager, Mr. Nield will also work with the sales division.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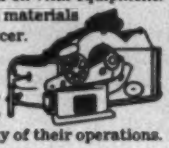

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1-31b

Patent Abstracts

● *In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.*

U.S. 2,533,433 — Web Former and Cutter for Satchel Bottom Paper Bags. Converse V. Clark, Toledo, Ohio, assignor to The Chase Bag Company, New York, N. Y. Filed June 8, 1945 — Issued December 12, 1950.

1. In a power driven machine for making satchel bottom flat bags from a web of bag material fed through said machine from a continuous source of supply, located at the front of the machine, to the delivery end thereof, a substantially flat apertured bed plate on the machine, an extension plate mounted above the rear end of and spaced from the top of the bed plate, a forming iron spaced above said bed plate for forming said web into a flattened tube folded about said forming iron and said extension plate, said forming iron including a tube forming guide portion and a substantially flat tube flattening portion, the front end of said extension plate being connected to the rear end of said forming iron so as to form a part thereof, a cut off knife for transversely cutting said flattened tube into bag lengths, the extension plate being formed with an opening and a pair of slits at each side of said opening, upper and lower vertically spaced rotatable horizontal shafts extending transversely of said machine adjacent said cut off knife, one shaft above and the other below the extension plate, a thumb notch cutter and a pair of spaced slitter cutters on one of said shafts and a second pair of spaced slitter cutters on the other of said shafts, said shafts being operable simultaneously whereby said notch cutter and said first pair of slitter cutters and said second pair of slitter cutters will be moved in an arcuate path into contact respectively with the top and bottom folds of said tube whereby a transverse thumb notch will be cut in one fold and a pair of longitudinal slits will be cut in each of said folds adjacent the line of cutting of said cut-off knife.

U.S. 2,533,557 — Coated, Nonfibrous Regenerated Cellulose Sheet Wrapping Material and Process of Making Same. Aurelius Franklin Chapman, Kenmore, N. Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del. Filed April 15, 1949 — Issued December 12, 1950.

The process of producing coated, transparent, sheet wrapping material which comprises impregnating gel regenerated cellulose film with an aqueous softening bath containing from 0.05% to 10% by weight of a water-soluble, partially condensed guanidine-urea-formaldehyde resin obtained by reacting formaldehyde, guanidine and urea in the proportions of from 1 to 4 mols of formaldehyde and from 0.02 to 0.25 mol of guanidine per mol of urea, drying the impregnated film and thereafter coating the impregnated film with a protective composition from the group consisting of moistureproofing and semimoistureproofing coating compositions for regenerated cellulose containing from 0.1% to 10.0% by weight, based on the solids content of the composition, of maleic acid.

U.S. 2,533,773 — Ventilated Corrugated Board Container. Norman F. De La Foret, Toledo, Ohio, assignor to The Ottawa River Paper Company, Toledo, Ohio. Filed July 16, 1949 — Issued December 12, 1950.

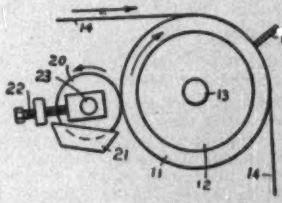
A container comprising a body of corrugated sheet material having an intermediate ply provided with a series of elongate corrugations interposed between and connected respectively to relatively flat inner and outer liner plies, a perforation penetrating only the inner liner ply and the corrugated ply, and another perforation penetrating only the outer liner ply and the corrugated ply, said perforations penetrating the same corrugation by spaced points thereby to enable an exchange of air between the inside and outside of the container through said perforations and the channel formed by the respective corrugation.

U.S. 2,533,842 — Method for Preparing Chlorine Dioxide Gas. Johan Waldemar Sevón and Frey Viking Sundman, Kuusankoski, Finland; Karl-Gustaf Birger Fogelholm, administrator of the estate of said Johan Waldemar Sevón, deceased, assignors to Kymin Osakeytio-Kymmene Aktiebolag, Kuusankoski, Finland. Filed May 16, 1946 — Issued December 12, 1950.

A process of producing chlorine dioxide which comprises contacting a member of the group consisting of sulfur dioxide and gas mixtures containing sulfur dioxide with a chlorate containing solid in the presence of insufficient water to dissolve the chlorate, with mechanical agitation to increase the extent of contact between the gas and the solid.

U.S. 2,534,321—Coating Method and Apparatus. William Palmer Taylor, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio. Filed May 16, 1946 — Issued December 19, 1950.

In a paper coating operation wherein a freshly coated paper web is carried on the surface of a moving, yielding, and resilient carrier of the nature of rubber, past a location where it



is subjected to a doctoring operation in which pressure of a doctor member against the supported web deforms and locally elongates the supporting carrier surface to some degree, the method of preventing wrinkling and tearing of the paper at said location, which comprises moistening the moving surface of said carrier in advance of the position where the paper is carried thereon and thereby causing the paper to adhere to said surface where it is carried thereon.

U.S. 2,534,008 — Insecticidal Paper-Coating Compositions. George W. Fiero, Port Chester, N. Y., and Howard F. Seeland, Little Silver, and George H. Batt, Rahway, N. J., assignors, by mesne assignments, to Standard Oil Development Company. Filed July 10,

1947 — Issued December 12, 1950.

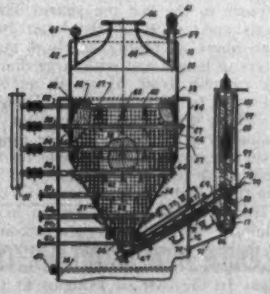
A non-alkaline insecticidal paper coating composition consisting by weight of

	Parts
Dichloro-diphenyl-trichloro ethane	20
Clay	19
Suspending and wetting agent	2.5
Octyl alcohol	0.2
Chlorinated starch solution	8.8
Water	50

U.S. 2,534,026—Web Looping Device for Festoon Type Driers. Frederick E. Hurxthal, Glenside, Pa., assignor to Proctor & Schwartz, Inc., Philadelphia, Pa. Filed July 29, 1947 — Issued December 12, 1950.

In apparatus for forming a web of material into a series of festoons over relatively spaced girts of a supporting conveyor, means above the conveyor for feeding the web between an adjacently disposed pair of said girts to form a festoon therebetween as the conveyor advances, a nozzle pivotally mounted forwardly adjacent said means for swinging movement in the plane of travel of the conveyor and arranged to discharge air under pressure at the forward side only of said web and downwardly between said adjacently disposed pair of girts to assist in the formation of the festoon of the web, intercooperating means on said nozzle and conveyor operable to cause said nozzle to advance with said conveyor a limited portion of the travel thereof so that air discharged from the nozzle is directed properly between said pair of girts during formation of the festoon as the conveyor advances, deflector means associated with the discharge end of said nozzle comprising a member presenting a curved surface to the discharged air and having its free edge spaced from the advance girt and directed away from the trailing girt of said pair so that air discharged from the nozzle passes over the curved surface of the deflector means and beyond the free edge thereof and discharges through the space between said free edge and said advance girt forwardly and away from said trailing girt to draw the web forwardly away from said trailing girt to prevent fouling of the web thereon during formation of the festoon between said pair of girts, and means operable to hold the web on the advance girt of said pair during the formation of the festoon between said pair of girts.

U.S. 2,534,324 — Process for Separating Cooking Liquor from Pulp. Paul G. von Hildebrandt, Port St. Joe, Fla. Filed July 2, 1945 — Issued December 19, 1950.



The process of separating pulp from cooking liquor in the manufacture of paper, which comprises diffusing steam through a moving mass of said pulp and draining the liquor from said mass.

U.S. 2,534,201—Carton Having Metal Corrosion Inhibiting Characteristics. Clemens A. Hutter, Chicago, Ill., assignor to Nox-Rust Chemical Co., Chicago, Ill. Filed November 1, 1949 — Issued December 12, 1950.

A corrugation formed of integrated plies of paper stock wherein the outer plies have from 1/3 to 10 pounds of a metal corrosion inhibiting composition per 100 square feet of surface area, said composition comprising the combination of an organic amide and an inorganic metal nitrite.

U.S. 2,534,703 — Dry Resinate Composition. Earl Stanley Fenelon, Jr., Elroy, Wis., and Edwin C. Howard, Wilmington, Del., assignors to Hercules Powder Company, Wilmington, Del. Filed October 18, 1947 — Issued December 19, 1950.

A dry resinate composition comprising dry, saponified rosin and a petroleum resin containing less than 5% asphaltenes, the composition being characterized by being dispersible in water to form a dispersion free from asphaltic agglomerates, the petroleum resin comprising up to two-thirds of the total solids of the composition, said petroleum resin being isolated from petroleum distillation residues and being the resin which is obtained therefrom through the addition of propane in an amount to precipitate the asphalt content of the petroleum distillation residue and subsequent addition, to the substantially asphalt-free petroleum residue, of a further quantity of propane to precipitate theh petroleum resin therefrom.

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ANSUL CHEMICAL COMPANY
INDUSTRIAL CHEMICAL DIVISION MARINETTE WISCONSIN

WOOD AND PULP PROPERTIES

(Continued from page 30)

the chemical makeup of the fibers help determine the papermaking properties. In addition to these qualities in sound wood, we must also deal with their modification by natural deterioration of the wood.

For purposes of discussion it is convenient to trace these properties as inherent to species, to growth type, and to wood condition.

Fiber Properties Inherent in Species

Hardwoods and Softwoods

The large difference between dimensions of fibers found in hardwoods (deciduous) and in softwoods (coniferous) is highly characteristic. In the former the woody fibers are typically one millimeter long, and 10 to 25 microns in diameter at the widest point. Tracheids of the latter are about 3.5 millimeters in length with a range from less than 3 to over 5 millimeters. Maximum diameters are in the range of 30 to 50 microns.

The dimensions of the softwood fibers are better suited to the manufacture of strong papers, with the result that these woods have furnished a preponderant percentage of the raw material. Due to their small dimensions, hardwood fibers are deficient by comparison in practically every strength property. This does not mean that hardwood fibers do not have some important papermaking qualities. Their small size promotes a uniform formation, increases bulk which improves opacity, and gives a smoother textured surface. All these properties are highly desirable in paper for printing, and strength is of lesser importance, with the result that there has been a small but steadily demand for hardwood pulps in paper mills making various types of these papers.

In recent years the shortage of softwoods in some regions has forced the use of hardwoods for papermaking in increasing amounts. The hardwood pulps for printing papers have been cooked very soft by the soda process to enhance qualities of formation and texture at the expense of strength. This type of cook has masked to some extent the characteristic chemical property of hardwoods, that is the high hemicellulose content, by dissolving a large portion of this less resistant carbohydrate material. It is known that hemicelluloses and particularly pentosans tend to increase rate of beating, bursting and tensile strength, and transparency of paper.

Now that it is desired to add hardwood pulps in which strength is of prime importance, the type of cooking has changed radically. Normal sulfite and kraft cooks have improved strength over the soft soda cook, but the strongest hardwood pulps along with high yields are made from a neutral sulfite semi-chemical cook followed by bleaching. A large portion of the hemicellulose is retained in the pulp resulting in a very rapid rate of beating, a bursting and tensile strength approaching that of softwood pulp, and increased transparency. Tearing resistance, which is dependent on fiber length, is low.

To date, this type of cook is largely confined to hardwoods, since it is slow in its lignin removal, and hardwoods contain considerably less lignin than softwoods. Here the wood properties have a bearing on the selection of the type of cook in addition to the type of pulp obtained.

Pulp Characteristics From Various Regions

There are marked variations in pulp characteristics by regions. It is recognized that these variations are due primarily to species, but it is interesting to speculate on whether differences in the climate and soil types determine the species to which certain physical and chemical characteristics are unique, or, whether under similar growing conditions, certain of these differences would tend to disappear.

The United States has four papermaking regions including the Northeastern States, the central section around the Great Lakes, the South, and the Pacific Northwest. For purposes of discussion, the first two may be considered as one since the wood species and their properties tend to be the same.

The papers from wood grown in the North Central and Northeastern States tend to be well-formed, to have good burst and tensile strength, but only fair tearing resistance, and to have good surface smoothness. Papers from woods grown in the Pacific Northwest have a less uniform formation, slightly less burst and tensile strength, but an excellent tear resistance, and a somewhat rougher finish than the first group. Papers from the South are nearly all kraft because the pulpwood is almost exclusively pine, but by comparison to similar papers in other regions, the formation again is somewhat non-uniform, burst and tensile strengths are rather low, but tear resistance is nearly equal to the western woods. Again the surface tends to be a little rough.

Fiber properties characteristic of the woods from the various regions are largely responsible for these characteristic variations of the respective papers. The best pulpwood of the North is black spruce. Its fibers are medium in length, averaging between 3 and 3.5 millimeters. The wood is slow grown so that diameters will run from 25 to 35 microns. These dimensions contribute to the good formation, good smoothness, and low tearing resistance. The good formation together with high hemicelluloses, which become fiber cementing material in papermaking, enhance burst and tensile strengths.

Western hemlock is the prime pulpwood of the Pacific Northwest, with Douglas fir attaining considerable importance in the last ten years. These woods and especially the latter have large fibers averaging nearly 4 millimeters in length and with large diameters ranging from 35 to 45 microns and even to 55 microns for Douglas fir. These dimensions account for the less uniform formation and the rougher surface, and are responsible for the exceptional tearing resistance of papers from that region. The woods and therefore the pulps are low in hemicellulose. This characteristic accounts for the slower development of strength as compared to northern and eastern pulps. In the case of Douglas fir this tendency is further enhanced by the very thick-walled summerwood fibers which detract from burst and finish, but make tearing resistance higher than that of any other papers made from wood pulps.

The fibers in the pines from the

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South are comparable to Douglas fir in dimensions and the paper characteristics are quite similar.

In color, the North and Northeast regions have the whitest woods and have the brightest pulps. The woods from the Pacific Northwest have a reddish cast, and the pines in the South are definitely yellowish.

Pulp Characteristics From Wood of Various Growth Rates

Data of Chidester and McGovern[1] have shown that faster growth wood will tend to have a slightly higher burst but considerably lower tearing resistance. They also pointed out the increase in percentage of springwood with rate of growth. This is particularly true of younger trees.

Springwood fibers as compared to summerwood have larger diameters with thinner walls. Such fibers will flatten in the papermaking process, and make excellent fiber-fiber contacts and bonds that produce high burst and tensile strengths. Also these thin-walled fibers are not resistant to the cutting and bruising of beating and jordanning, and break up more than summerwood fibers, causing low tearing resistance.

Douglas fir is unique in the difference between its springwood and summerwood fibers. The differences in the pulp properties of these fibers were brought out in a study reported by Holzer and Lewis.[2] Springwood and summerwood were separated by hand and the two portions cooked separately. The springwood fibers, even unbeaten, formed into a smooth, hard sheet with high burst and low tear. As beating progressed, the burst rose rapidly and tear dropped to very low levels. The fibers were drastically cut in the process. Summerwood fibers, on the other hand, gave a very bulky, woolly sheet that had a very low burst, but an unusually high tear. These fibers were extremely resistant to beating with almost no evidence of cutting at the end. The physical tests showed correspondingly small change in strength in the process.

The walls of Douglas fir summerwood fibers are unusually thick, but their most unique property is the crystallinity of the cellulose itself.[3] This cellulose probably has the most highly molecular structure found in wood, and aside from the thickness, or in addition to it, would be expected to be stiff, and difficult to form into a compact sheet.

Properties Inherent in the Condition of the Wood

Since papermaking depends on the individual wood fiber, it can utilize to good advantage logs that contain physical defects that make them unsuitable to other industries. Such defects as splits and breaks, roughness due to knots, crooked logs and the like, have little effect on fiber quality and need no further discussion. Overmature wood or salvaged wood which contain decay do have an effect on fiber quality. Along with the consumption of the woody material, the process of decay for our consideration involves the production of stain, and of organic acids that can act on wood at low temperatures but over long periods. The effects on the pulp are:

1. The color of the pulp is noticeably darker. This can be seen from wood where the deterioration is still in the early stages.
2. The acid of the products of decay acting over long periods makes the lignin more difficult to dissolve, probably through polymerization to larger, more inert molecules.
3. The cellulose is found to be degraded from acid and enzyme action, and in case of advanced decay very brittle and weak.

The correlation between degree of decay and effect on pulp quality is in the order named. The deterioration of pulp color is noticed along with incipient decay and persists through all degrees. The decrease in rate of cooking of wood is first detected when decay approaches an intermediate stage. The loss in strength of pulp may be detected earlier but does not become serious until decay becomes advanced, appreciable portions of the wood have been consumed, and the wood has lost considerable strength. Then, too, as the wood loses density, it becomes obvious that less can be charged into a digester of given volume, and the production per cook suffers proportionately.

In observing the effect of decay on pulp quality, results are sometimes confusing. That is, one lot of badly decayed wood may make fairly good and even almost normal pulp, while the next, showing much less decay, may yield a definitely inferior pulp. The explanation usually lies in the type of decay.

There are two main types of decay organisms, those classed as lignin-destroying rots, such as *fomes pini*, and those classed as cellulose-destroying rots, such as *Lenzites saepiaria*. By the time the wood is consumed, both types have been active but usually one or the other will predominate in attack until decay is well advanced. Which type will start first may depend on species or on local physical conditions, but a discussion of these factors is beyond the scope of this paper.

A lignin-destroying rot tends to leave the fibrous structure of the wood intact. The decayed wood being fibrous retains some of the toughness of the original wood, and "stands up" under the mechanical process of converting the log into chips. In so doing, it stays in the chips entering the digester, and the pulp is affected in proportion to the amount and degree of decay in the ways already described.

When wood is attacked by a cellulose-destroying rot, the fibrous structure is broken down, and a soft, crumbly material results. If the decay is well advanced, the affected portions tend to sluff off during the wood and chip preparation, and only the sounder portions enter the digester. For this reason pulp quality usually suffers less from a cellulose-destroying rot, especially one that tends to localize its action.

In all forest products industries the manufacturer must utilize the wood as he finds it. In many cases only the physical properties are significant. In pulp and paper manufacture the chemical nature of the wood also must be considered, and, since the process can tolerate an appreciable amount of decay, the effects of this defect are felt as well. After all, it may be best that, as the poet says, "Only God can make a tree", since none of us would care to accept the responsibility for the variations we find in the quality of our raw material.

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[1] Chidester, G. H., and McGovern, J. N. *Paper Trade J.* 106, No. 23: 37-39 (June 9, 1938); 107, No. 13: 34-29 (Sept. 29, 1938).

[2] Holzer, W. F., and Lewis, H. F. *TAPPI* 33, No. 2: 110-112 (Feb. 1950).

[3] Clark, G. L. *TAPPI* 33, No. 2: 106-110 (Feb. 1950).

SET-UP BOX COMPETITION

The National Paper Box Manufacturers Assn. is sponsoring a Set-Up Paper Box Competition concurrent with their 33rd annual convention in Atlantic City, N. J., June 3-6.

INTERNATIONAL WIRE WORKS

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AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6, 1951
1950	101.3‡	100.6‡	97.3‡	67.3‡	94.9
	Dec. 10	Dec. 17	Dec. 24	Dec. 31	Jan. 7,1950
1949	*99.9*	*98.7*	*87.9*	*72.7*	*88.2*

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	*92.6*	*95.6*	*96.7*	*95.4*	*96.4*	*97.7*	*85.5‡*	*100.3‡*	*98.2‡*	*101.2‡*	*100.3‡*	*93.7‡*	*92.9‡*
1951													

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1944	1945	1946	1947	1948	1949	1950	1951
Year to Date								
Year Average	88.1	89.4	100.1	104.3	96.2	88.6	92.9‡	

PAPERBOARD OPERATING RATIOS†

	Dec. 9	Dec. 16	Dec. 23	Dec. 30	Jan. 6, 1951
1950	106	105	105	63	91
	Dec. 10	Dec. 17	Dec. 24	Dec. 31	Jan. 7, 1951
1949	*96*	*92*	*92*	*53*	*74*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	88	92	91	92	91	94	82	100	96	102	101	95	94
1951													

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

NOTE: The chart shows the ratio through December 1950 on the basis of 6-day capacity. Beginning with January 1951 the ratio is shown on the new basis of normal 6- and 7-day capacities. Corresponding weekly and monthly ratios for 1950 on the new basis, shown in the tables above, are somewhat lower.

Paperboard operating ratios continue on the basis of a 6-day week.

† Per cents of operation based on "inch-hours" reported to the National Paperboard Association.

Stockpiling Cups and Containers

A voluntary plan to stockpile 25 million paper cups, dishes and food containers in strategically located warehouses throughout the United States for emergency disaster use by public agencies is now being effected by the members of the Paper Cup and Container Institute, Inc.

Civilian disasters of any kind require huge quantities of supplies. About the only way to feed large numbers of people in situations where sanitation facilities are not available is with paper.

Dale H. Eckerman, president of the Institute says: "It is hoped that the plan will accomplish the following things:

1. Insure at least a few days' supply of the industry's products in time of emergency even though the emergency might come at a time when inventories would be low and to make them available quickly by warehousing as close as possible to potential danger points.

2. Make it unnecessary for communities to purchase the industry's products for a lot of little stockpiling (the result of which would be to tie up many times the number of cups and containers that would be set aside in this plan) by having supplies in a few strategic locations available to many such communities."

Specific locations will be picked as fast as the civilian defense network is completed to the extent that it can be established that the locations fit into overall plans. Presumably they will be at 12 to 15 points outside large cities but near enough to be easily accessible. They will ordinarily be in private warehouses and maintained there at the Institute's expense.

Duly constituted civil defense authorities and Red Cross personnel or public health officials on a level to be established after consultation with authorities in each area will have the right to draw on the supplies at any time they feel the emergency warrants.

The stock will be turned over to the Paper Cup and Container Institute, Inc., by the member companies and held in their name unless civilian defense authorities later feel that they should take it over. If unused, it will be returned to members, or otherwise disposed of when the emergency lessens.

The 25 million cups and containers being set aside will be made up of the following types in substantially the quantities listed:

5,000,000 cups for milk or other cold drinks in 6 or 7 ounce sizes.

3,000,000 cups for fruit juices, medications, etc., in 4 or 5 ounce sizes.

2,000,000 medicine cups in 1 or 2 ounce sizes.

5,000,000 cups for coffee or other hot drinks in 6 to 8 ounce sizes.

2,000,000 containers for soups or other hot foods in 8 to 16 ounce sizes.

3,000,000 dishes in 6 or 7 oz. sizes for puddings, vegetables, etc.

5,000,000 water cups.

100 portable dispensers for hot or cold liquids.

Details in working out the plan will be handled by the Field Research Division of the Institute, whose field workers will make local arrangements for warehousing, coordinate with local officials, etc. Any additional details may be had from Lawrence McCracken or Farley Manning, Field Research Division, Paper Cup and Container Institute, Inc., 551 Fifth Avenue, New York 17, N. Y.—Telephone Murray Hill 2-0071.

RIVER RAISIN PAPER CO., Monroe, Mich., announces the appointment of H. V. Hodge as general sales manager, effective January 1. Mr. Hodge has been assistant sales manager since 1936. In his new position he will head up the company's sales organization with headquarters at Monroe, Mich.

OBITUARIES

Louis Van Burk, Albany district sales manager for the APW Paper Co., died January 9.

He had been associated with the paper company more than 30 years.

Surviving are his widow, the former Helen V. Z. Coughtry; a sister, Mrs. Ervin B. Stevenson, and three brothers, Clarence, Henry and Walter Van Burk.

Matthew V. Horgan, superintendent of the American Writing Paper Corp., until his retirement a year ago, died recently in his home of a heart attack.

Eric G. Tangeman, 48, president of the Southwest Paper Co., Wichita, Kansas, died December 29. In addition to his widow, he is survived by one son, John Tangeman.

Harry R. Serf, assistant treasurer of the Schmidt & Ault Paper Co., York, Pa., died suddenly January 3. Mr. Serf's affiliation with the Schmidt & Ault Paper Co. dated from 1913.

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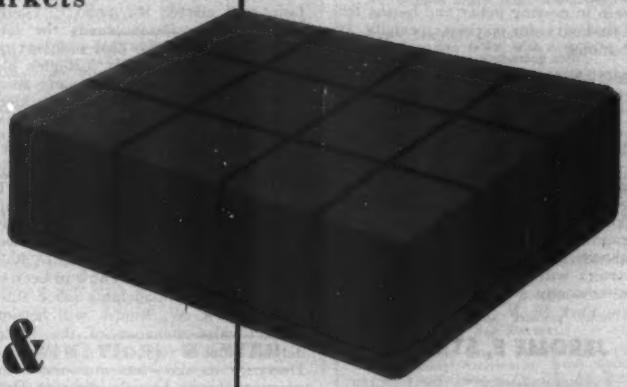
to all world markets



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Sao Paulo

10 East 40th Street, New York 16, N. Y.

SUPPLIERS

UNITED STATES RUBBER CO. announced the purchase of the Buna-N synthetic rubber plant of Esso Standard Oil Co., Baton Rouge, La., as a major step in the expansion of its facilities for the manufacture of chemicals, plastics and synthetic rubbers. The purchase price was not disclosed. The plant will be operated by the Naugatuck chemical division of the rubber company which will continue to market Buna-N rubber under the trade name paracril.

This purchase increases the company's facilities to produce high styrene copolymer latex in demand by the paint industry as a base for the newer types of water paints, by the paper industry as a partial replacement for casein in coating paper and by the textile industry for various specialty applications.

MORNINGSTAR, NICOL, INC., New York City, announces that Jerome P. Strasser has joined their management as of January 7. Mr. Strasser will direct the development and sale of starch specialties and adhesives to the paper industry. For many years he has been closely associated with the paper industry from coast to coast, and is recognized as one of the leading authorities in this field. His headquarters will be at the main office of the company, 630 West 51st street, New York 19, N. Y.

JEROME P. STRASSER

RAYMOND C. GANGLER

AMERICAN CYANAMID CO. on January 5 elected Raymond C. Gaugler president. He succeeds the late William B. Bell, who died suddenly on December 20, 1950. Mr. Gaugler has been a director of the company since 1929 and has served as executive vice-president since his appointment to that position on October 23, 1947.

BABCOCK & WILCOX CO. has announced the appointment of S. T. Mackenzie, head of the Philadelphia office to the newly created post of sales manager. Mr. Mackenzie, who will headquarter in New York, joined Babcock & Wilcox in 1934 and had been in charge of the Philadelphia office since 1946. Mr. R. W. Buntin will become district sales manager of the Philadelphia office to replace Mr. Mackenzie. HOWE SCALE CO., has announced the opening of new branch offices at Denver, Col., and at Houston, Texas. The Denver office is located at 2524 Walnut street and is managed by Mr. Daniel O. Ferris. The Houston office is located at 2215 McKinney Avenue and is managed by Mr. Henry K. Leonard.

THE RELIANCE ELECTRIC & ENGINEERING CO. has established new branch sales offices in Newark, N. J., and El Dorado, Ark., and has transferred to Buffalo from Syracuse the district office directing the company's sales throughout northern and western New York State.

INTERCHEMICAL CORP. announces executive changes effective January 1 as follows: A. Wallace Chauncey, vice-president and treasurer of the corporation, resigned the office of treasurer. He will continue as a director. Claud Brown, now a vice-president of the International Printing Ink Division of the corporation, was elected to succeed Mr. Chauncey in the office of treasurer. F. A. Weymouth, a divisional vice-president of IPI, will take over Mr. Brown's responsibilities in manufacturing, labor relations and procurement.

STAUFFER CHEMICAL CO. announced January 9 that they are now installing additional equipment to expand again their chlorine production at Niagara Falls. A 50 percent expansion was announced a year ago and that additional capacity will be ready in 60 to 90 days. The second expansion, just announced, will bring total capacity to well over 100 tons daily. Completion of this second expansion is set for January 1, 1952. The company Engineering Department is in charge of the project with the assistance of Singmaster and Breyer; local contractors will be used.

CONOFLOW CORP., manufacturers of valves and pneumatic control equipment, have announced the appointment of John C. Koch to vice-president in charge of sales. Mr. Koch, who joined Conoflow in 1945, has been acting in the capacity of general sales manager in Philadelphia until his recent promotion.

JOHN C. KOCH

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POSITIONS OPEN

We can place bag factory superintendent (new plant); superintendents and foremen for paper coating depts.; office manager; time study-methods engineer; master mechanics, plant, mechanical and electrical engineers, draftsmen, designers, machinists and millwrights for mills and for firms building machinery.

Chemists and chemical engineers, also recent chemical graduates, one chemist for paper coating plant, another chemist for tissue and de-inking; Cylinder machine tour bosses for New England and Midwestern mills; salesmen for mill machinery and special mechanical equipment, chemical or mechanical engineers with mill experience will be considered; beater engineers; Cylinder and Fourdrinier machine tenders, back tenders and third hands, man to put clothing on paper machines; cutter man.

LIST YOUR CONFIDENTIAL APPLICATION WITH US.

We will keep you informed of attractive positions open in the pulp and paper mills.

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SPECIALISTS IN PLACING PULP AND PAPER MILL EXECUTIVES
J-19

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Paper converting, nationally known. Printing, coating, gumming, laminating, finishing operations. Lifetime position for top-flight production executive. Our people know of this ad. Send full details confidentially to President, Box 50-443, care Paper Trade Journal. TF

WANTED

Night Superintendent to take full charge of two-machine Mill making Sulphite and Bag Cement Papers. Must be experienced, aggressive, honest, and dependable. In application, state complete details and references. Excellent opportunity for an ambitious man. Write Box No. 50-626 care Paper Trade Journal J-19

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MASTER MECHANIC
wanted in New Jersey.
Cylinder Machine.
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J-26

WANTED — SALES ENGINEER — Experienced in Pulp and Paper Mills, for sales and service work. Excellent opportunity with old established machinery manufacturer. In reply, give resume of education, experience and current salary. Address Box 50-513 care Paper Trade Journal. TF

CHEMICAL ENGINEER to fill position of Assistant Quality Control Supervisor in large fiber insulation board manufacturing plant, located in South. All replies confidential. Our personnel know of this ad. Address Box 50-621 care Paper Trade Journal. J-19

HELP WANTED

WORKING SUPERINTENDENT for small, fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 50-578 care Paper Trade Journal. TF

ENGINEERING DRAFTSMEN. Need two for old established well known machinery manufacturer located in North Central Wisconsin. Paper machinery background valuable. Excellent opportunity. Permanent. State qualifications and salary expectations in first letter. Address Box 51-24 care Paper Trade Journal. J-26

INSTRUMENT MAINTENANCE MAN to work with one of two assistants. New plant. South Atlantic coastal. Excellent opportunity. Begin about May 15th. Address Box 51-21 care Paper Trade Journal. J-26

WANTED—MASTER MECHANIC for one machine mill making Folding Grades. Good salary and good working conditions. Contact K. K. STEARNS, Empire Box Corp., of Stroudsburg, P. O. Box 54, Stroudsburg, Pennsylvania. F-2

WORKING SUPERINTENDENT for small napkin converting plant. Knowledge of printing essential. State salary, experience, etc. Address Box 51-4 care Paper Trade Journal. J-26

WANTED: DESIGN AND PROJECT ENGINEER—California. 3 to 13 years experience and engineering degree. Experience in insulations, floorcoverings, roofings, building materials and paper mills preferred. Competitive salary depending upon individual qualifications. Address Box 51-11 care Paper Trade Journal. J-19

SITUATIONS WANTED

DEVELOPMENT AND SALES ENGINEER

Technical and practical training, converting experience, all grades and weights of paper, large or small mill. Address Box 51-12, care Paper Trade Journal. J-19

MILL SUPERINTENDENT with proven ability in conventional or Yankee Fourdrinier Mill manufacturing light or heavy weight Kraft or sulphite specialty grades. Desires new connection. Address Box 51-14 care Paper Trade Journal. F-2

SALES REPRESENTATIVE covering Philadelphia, Eastern Pennsylvania and surrounding territory, desires line of Toilet Tissue, Napkins, Towels, Paper and paper products on a commission basis. Address Box 51-15, care Paper Trade Journal. J-12

PLANT MANAGER—Manufacture and conversion of boards and papers; wants change for greater opportunity. Competent and successful in organization; production; and labor relations. Address Box 50-521 care Paper Trade Journal. J-26

KRAFT PULP MILL MAN IS AVAILABLE NOW WHO HAS YEARS OF SUCCESSFUL PRODUCTION AND TECHNICAL CONTROL EXPERIENCE. ANYONE INTERESTED PLEASE ADDRESS BOX 51-7 care Paper Trade Journal. J-26

[redacted]

FOR SALE—5 Globe Rotaries, 14 ft. diameter, will sell cheap. Reply to Sangamon Paper Mills, Inc., 137 W. Pershing Road, Chicago, 9, Ill. J-26

FOR SALE

CAMERON SLITTERS

1—72" Type 10—Model 5.
1—52" Type 8—Model 5.
1—42" Type 26—Model 2A.
1—32" Model 24—3A Duplex.
1—38" Langston Center Wind Duplex S&R.
1—32" Type 40, Model 2A.
1—30" Langston Type "A" Shear Cut Slitter & Rewinder.
1—40" Faico Model C Slitter & Rewinder.

POWER PAPER CUTTERS:

6—Seybold: 1—71" Precision, 1—64" 20th Century, 1—40" 10Z, 1—40" 62, 1—34" Holyoke, 1—34" 20th Century. 2—Oswego, 44" and 37". 1—Sheridan, 1—40". 2—Acme, 32" and 42". 1—S&W Undercut, 63".

3—61" Dietz Toilet Paper Perforators. Sheets 4½ x 4½ and 4½ x 5 and paper woven perforated 7⅛ and 13⅛".

1—51" Hudson Sharp Toilet and Towel Perforator.

1—Paper Converting Machine Co. ⅙ fold, 3 web napkin folder with embossing attachment, Extra Embossing rolls.

1—40" Paper Converting Machine Co. Towel Interfolder.

1—Pickett Garment Bag Machine, making bags 38" and 54".

1—Potdevin, Model 88 Sack Machine. 1 lb. to 5 lb. size range.

6—Potdevin Bag machines with two color printing units. 1—Type 294, size 0693-103, flat and square bags. 4—Type 313 Size 9112-301, satchel bottom and flat bags. 3—Type 91 FAS Size 1, Flat and square bags.

3—Lockport Flat & Square Bag Machines. One #2; one #3.

1—20" Champlain 4-color Rotogravure Press.

1—32" 3-color Aniline Printing Press for tailprinter on a Bag Machine.

1—64" Hamblet Single Rotary Sheet Cutter. Slitting Attachment, 3-roll double-deck Backstands and 7½ HP, AC Motor Equipment.

2—Duplex Sheeters, 1—64" Dillon and 1—64" Moore & White.

1—61" Hudson-Sharp Embossing Machine.

1—43" German Dornbusch Embossing machine with two sets of embossing rolls.

1—38" Holyoke Roll to Roll Embosser, Heavy Type. Two New Steel Rolls and One New Paper Roll.

1—60" Shartle & Devis Waxing Machine. Vacuum Type Water Removal Unit. Variable Speed AC Motor Drive.

1—84" Potdevin Squeeze Roll Waxing Machine.

1—84" Special Type Waxing Machine.

1—84" Miami Lo-Type Waxing Machine.

1—88" Potdevin Waxing Machine. Model 79.

1—72" Waldron Brush Coating Unit. With AC Motor and Reeves Drive.

1—No. 3 Nash Hytor Vacuum Pump, Reconditioned.

1—60" Meisel 3 Color Roll to Sheet Adjustable Rotary Printing Press—centered printing to register on sheets 29" to 30" in length by ⅛".

1—25½ Reeves Drive with 50 h.p. motor and electrical controls.

1—Electric operated Minnich Baler. Makes bales 27" x 54" x 60".

1—40" 6-Roll Holyoke Stack of Super Calenders. 4—Metal; 3—Cotton. Complete with drive.

1—#2 Noble & Wood Experimental Beater.

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Reply to Room 903
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J-19

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FOR SALE

32" Cameron model 24-3A Slitter.
49" Kidder model CH shear cut Slitter.
37" Hobbs Box Slitter.
44" Book Sheeter with 10-roll back-stand and layboy.
30" Hamblet Sheeter.
65" Finley Sheeter.
100" Horse single-knife Sheeter.
68" Oswego mill type Power Cutter.
30" Acme & 49" C. & P. Automatic Power Paper Cutters.
26 x 40 Kidder one-color Rotary.
3-color Cottrell 22½ Dry Press.
Model B Cleveland Folder with continuous feeder. Extension Delivery for 4-0 or 5-0 Miehle.
No. 3 Smyth Book Sewer.
16 and 24-page Newspaper Presses.

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Supercalender—One modern right-hand 94" eleven roll web Norwood stack, speed range 50 feet to 2,000 feet per minute with automatic weighting control capable delivering one ton per lineal inch bottom nip. All rolls equipped with anti-friction bearings. Reliance variable speed drive with MG sets, driven by synchronous motor wound for 3 phase, 60 cycle, 2300 volts. Reply Box 51-22 care Paper Trade Journal. F-2

#2—Two Moore & White Screens both in operation until late November, 1950. Scott Paper Co., Chester, Pa., Attention E. W. Broomall. J-19

PAPER COATING MACHINERY MANUFACTURERS—Waxing, Oiling, Carbon, Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

FOR SALE

FOR SALE

Sulphate pulp plant. Capacity about 35 tons. Box Number 51-23, care Paper Trade Journal. J-20

WE OFFER FOR IMMEDIATE DELIVERY—

New Cutting Units for Score Cutting Slitters and Rewinders.

Best quality. Reasonable prices.

Address Box 51-20 care Paper Trade Journal. J-18

BUY U. S. SAVINGS BONDS

MACHINERY WANTED FOR OUTRIGHT PURCHASE

Paper Machines, Paper Mill Machinery and Converting Equipment.

WE OWN WHAT WE ADVERTISE

BEATERS
2—Dilts 750 lb. Iron Tub.

BELTING—NEW
87 feet 6" 15 ply Goodyear Rubber Belting.
865 feet 8" 4 ply Oliver Duck Transmission belt.
177 feet 10" 6 ply Oliver Duck Transmission Belt.

CALENDER ROLLS
46 Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—112" face 7 roll.

COATER—Board Machine
1—Beloit Board Machine Coater. Used on 115" machine.

CONVEYOR
1—18½ ft. long x 20" wide—with motor.

CORE CUTTERS
1—Cameron with 2" x 11½" mandrels.

COUCH ROLLS—Rubber
2—152" face x 13" diameter—Ball bearing.
1—152" face x 22" diameter—Ball bearing.
3—147" face x 19" diameter.
1—148" face x 19" diameter.
1—145" face x 13½" diameter. Ball bearing.
1—132" face x 19" diameter.
1—110" face x 20" diameter. New.

CYLINDER MOLDS
1—124" face x 30" diameter, with stainless steel shafts.

DRIVES—ENCLOSED HERRING BONE GEAR
4—Falk right angle 75 hp—ratio 6.31-1.
1—Falk right angle 250 hp—ratio 7.14-1.
1—Falk straight 275 hp—ratio 1.97-1.
1—Falk straight 250 hp—ratio 5.12-1.
Above complete with clutch pulleys.

DRYERS
1—60" face x 20" diameter. Chrome plated.
1—142" face x 42" diameter.
1—124" face x 48" diameter.
1—60" face x 20" diameter.
1—77" face x 49" diameter—with gear.
1—84" face x 30" diameter.
1—106" face x 19" diameter—Baby Dryer.
56—20" face x 42" diameter.
4—60" face x 20" diameter.
1—152" face x 60" diameter, with bearings.
4—100" face x 48" diameter—with gears and bearings.
3—110" face x 42" diameter with bearings and gears.
1—117" face x 48" diameter.
1—84" face x 30" diameter.
1—30" face x 40" diameter. Chrome plated with gears and bearings.
1—70" face x 18" diameter. Chrome plated with gears and bearings.
3—62" face x 30" diameter, with frames, gears and bearings.

FILTER PRESS
1—New Sperry filter press, size 12, type 41.

FILTERS
1—Oliver Vacuum Filters. Cylinder 19' face x 9'6" diameter. Steel vats.

FLAT SCREENS
2—2 plate Sandy Hill Roller Shoe with scrapers.
1—11 plate Beloit Roller Shoe with scrapers.
1—Harmon 12 plate.
1—Sandy Hill 12 plate roller shoe.

FOURDRINIER SECTIONS
1—P & J 150" x 80 ft. ball bearing. Complete from table to 22" diameter suction couch. Brass and Rubber covered table rolls. 6 Brass Suction Boxes operated at 1800' per minute.

JORDANS
1—26 Miami, tp motor drive.
1—Jones Majestic with base and couplings—
1—25 Appleton with base and couplings.
1—Jones Majestic. Stainless Steel Filling.

LAMINATOR
1—Downingtown 82" Laminator.

MOTORS
1—General Electric 150 h.p. vertical motor—1200 r.p.m., 440 v., 3 phase, 60 cycle.
1—U. S. 75 h.p. vertical motor. 1200 r.p.m., 440 v., 3 phase, 60 cycle.

PULP EQUIPMENT
1—Mitts & Merrill 617 Pulpwood chipper.
1—Trimbey pulp screen with scraper.
1—Waterous 2 pocket grinders. 32" wood. Complete with load regulators, speed regulators, motors and starters. Latest type. Used 3 years.
1—Bird ball bearing Pulp Screen. Practically new. Used 6 months.
3—APREW Ball Bearing Pulp Screens—30 ton capacity.

PULPERS
3—62 Lamneys with enclosed Falk Drives. New.

PUMPS
44—Centrifugal Pumps, open 6, closed impellers. Direct connected or Belt Driven. Extended base for motor. Assorted capacities and heads. Most used less than one year. Also new Goulds Pumps.

REDUCERS
1—Link Belt 40 h.p. Ratio 2.2-1. 900 r.p.m.-377 r.p.m.
1—Falk 75 h.p. Ratio 800-1. 900 r.p.m.-3 r.p.m.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
14—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

ROTARY SCREENS
4—42A Bird, fully rebuilt with new unit, plates, etc.—enclosed drive.
1—42 Bird—stainless steel vat.
1—42 Bird—iron vat.

SAVEALLS
3—Oliver, Vacuum type cylinder 120" face x 60" diameter.

SCREW PRESSES
1—Valley Voith Screw Press Size 2A, with new spare sets of plates.

SHEETERS
1—45" Dilts with 8 roll backstand.
1—49" Kidder Spot Sheeter.

SHREDDERS
1—American 27" Hammermill, anti-friction bearings.
1—Grout Waldron Cutter—type F-11—30" knives. Used 30 days.

SLITTERS AND WINDERS
1—Pusey & Jones 100" high speed slitters and rewinders.
1—Cameron 62" Model 8.
1—Cameron 72", Model 10-S—90" Rewind.
1—Kidder 130" Paper Machine Slitter and Winder—62" rewind.
1—Moore & White 120" Four Drum Paper Machine Slitter and Winder—60" rewind.
1—Beloit 125" Paper Machine Slitter and Rewinder—62" rewind.
1—Langston 60" Sheer Cut.

STUFF PUMPS
1—Sherlin 10 x 20 Triplex.

SUCTION BOXES
2—100"—all bronze.

SUCTION COUCH ROLLS
1—Millspaugh 22" diameter x 138½" center face.
1—Millspaugh 22" diameter x 108" drilled face.
1—Beloit 62" face x 18" diameter—Ball bearing.

SUCTION PRESS ROLLS
1—Millspaugh 131" drilled face x 22" diameter with stand & drive.

SUPERCALENDERS
1—60" Perkins 7 roll—with all electric equipment.

THICKENERS
1—Bird Thickener Iron End Vats—Cylinder 75" face x 42" diameter, with Shower and Felt take off roll.
1—Wood's Thickener Cylinder 200" x 36" with showers and doctor. Gear head motor drive. Used 2 months.

WATER FINISH UNIT
1—Valley Micronist Unit for water finish on paper—120' decktle.

WAXING MACHINE
1—Waldron 40" Waxer and Impregnator.

WHY LIST YOUR EQUIPMENT? — WE WILL BUY IT.

FOR SALE

COMPLETE
SUBJECT TO PRIOR SALE

84" Trim Machine, including:
Brownell Engine (new parts, overhauled, like new), Three (3) beaters (with motors) Stock Chest (with motors and agitators) Three (3) Noble and Wood Jordans (with motors), Piping, Mixing Boxes, Three (3) Primary Presses, Three (3) Secondary Presses, Complete Felt Section, including Gilbert and Nash Guides, Broughton Showers, Two (2) Calender Stacks (Sandy Hill nine roll stack and Farrel Birmingham nine roll stack), One (1) Downingtown Duplex Sheeter complete with drive, all drives for complete paper machine are Bagley and Sewall Bevel Gears. Complete line shaft, including hangers, bearings and pulleys, Two complete sets extractor rolls, air ducts and piping.

Extra spare Felt Rolls, Extra Primary Press Rolls, Extra Secondary Press Rolls.

This machine may be equipped for either a Cylinder or Fourdrinier type machine.

We have on hand many auxiliary and spare parts for this equipment, including pumps, motors, piping, valves, wiring, electrical equipment etc. Auxiliary equipment too numerous to mention.

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Wallkomsee Paper Mills, Division
P. O. North Hoosick, New York
TF

FOR SALE: Form 246 M, Kerr Steam Turbine, direct connected to Generator, 300 KVA, 3 phase, 480 volts, 3600 RPM, Allis Chalmers generator and exciter. Non-condensing turbine, 400 H.P., 3600 RPM when operating on 120 lb. gauge initial pressure. Immediate delivery. Will sell reasonable. Reply Sangamon Paper Mills, 137 W. Pershing Road, Chicago (9), Illinois. J-26

FOR SALE—64" Seybold Paper Cutter; 36" Beck and 42" Kidder Sheeters; 6' Brightwood; 26" x 38" Thomson Platen Die Cutters; also Paper Box, Container, and Paper Converting Machines of all standard makes and sizes. Write for listing. Address Box 51-19, care Paper Trade Journal. TF

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2—150 or 175 H.P., 440 volt, 3 phase, 60 cycle, 450 RPM motors, including starting compensators and contactor boards. Exciters not needed.

OR

2—175 H.P. squirrel cage 440 volt, 3 phase, 60 cycle, 450 motors, with starting compensators.

We can offer for sale or exchange two 330 volt motors to be released after purchase and installation of the 440 volt motors. Further details on request. In replying please give full information on 440 volt motors including price. Reply Box 50-604 care Paper Trade Journal. F-2

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-18 care Paper Trade Journal. TF

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WANTED—1—300 H.P. Synchronous Motor 80% Power Factor, 3 phase, 60 cycle. Reply to Sangamon Paper Mills, Inc., 137 W. Pershing Road, Chicago, 9, Ill. J-19

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Nopco Chemical Co.
Stein, Hall & Co., Inc.

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Nopco Chemical Co.

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Potdevin Machine Co.
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Shartle Brothers Machine Co.
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Timken Roller Bearing Co.
Valley Iron Works Co.

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Dilts Machine Works
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J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
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Valley Iron Works Co.

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Goodrich, B. F., Co.
The Goodyear Tire & Rubber Company
Link Belt Company

BIN DISCHARGERS
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Moore & White Co.
Niagara Alkali Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Lobdell Co.
Edward J. McBride
The Moore & White Co.
Perkins & Sons, Inc., B. F.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

CARRIER ROPE
Williams-Gray Co.

CASEIN
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Industrial Chem. Div.
Bunge Pulp & Paper Co.
Hercules Powder Co.

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Black Clawson Company
Babcock & Wilcox Co.
Carthage Machine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Hamblett Machine Co.
Hardinge Company, Inc.
Lobdell United Co.
Magnus Metal Corp.
Michigan Steel Casting Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Walworth Company

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Bird Machine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Engrg. Co.
Shartle Brothers Machine Co.

CHAINS
Link Belt Company
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WHERE TO BUY

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Gotteman & Co.
Hercules Powder Co.
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The Kinsley Chemical Company
Monsanto Chemical Company
National Aluminate Corp.
Niagara Alkali Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Rohm & Haas Co.
Virginia Smelting Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Kalamazoo Tank & Silo Co.
Shartle Bros. Mch. Co.

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The Dow Chemical Company
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General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co.
Wyandotte Chemicals Corp., J. B. Ford Division

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Black Clawson Company
Farrel-Birmingham Co.
Hudson Sharp Machine Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.

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Gibbs-Brower Company, Inc.
Hudson Sharp Machine Co.
The Mayer Machine Co., Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G., & Co., Inc.

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American Cyanamid Company Industrial Chemicals Division
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B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
J. M. Huber Corp.
Monsanto Chemical Company
National Wax Co.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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COMPLETE FOURDRINIER ROLL GRINDING
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Nash Engineering Co.
Roots-Connersville Blower Corp.

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CONTROLS
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Poirier Control Co.
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John Waldron Corp.
Dilts Machine Works
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Link Belt Company
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Ross Engineering Corp., J. O.
Shartle Brothers Mch. Co.
Stephens-Adamson Mfg. Co.

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Smith & Winchester Mfg. Co.
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Link Belt Company
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Thomas Flexible Coupling Co.
Valley Iron Works
Waldron Corp., John

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Industrial Brownhoist Corp.
Link Belt Company
Whiting Corp.

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Black Clawson Company
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Taylor, Stiles & Co. Works
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Manchester Machine Co.

CYLINDERS
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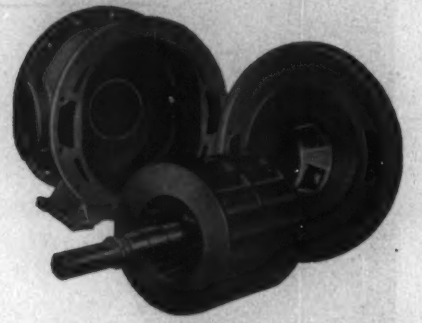

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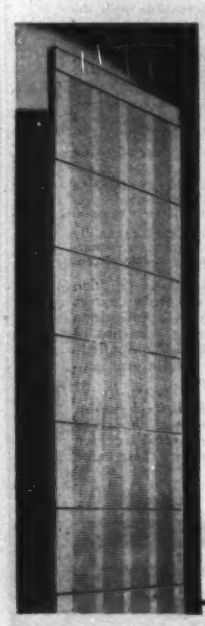

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Calgon, Inc.
Cowles Chemical Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

DIFFERENTIAL SCALES
Thwing-Albert Instrument Co.

DIGESTERS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Lakesweld
Pusey & Jones Corp.

DIGESTERS (Continuous)
Paper & Industrial Appliances

DISPERSING AGENTS
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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell United Co.
Lodding Engineering Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Bird Machine Company
Lodding Engrg. Corp
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co

DRIERS
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Lakesweld
The Moore & White Co.
Murray Mfg. Co., D. J.
T. J. Ross Company
Red-Ray Mfg. Co., Inc.
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

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Appleton Machine Co.
Bird Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs-Brower Company, Inc.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
T. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

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Stickle Steam Specialties Co.

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Thwing-Albert Instrument Co.

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M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

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Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co.

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Egan, Frank W., & Co.
John Waldron Corp.

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Gibbs-Brower Company, Inc.
Northern Engraving & Mch. Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wallerstein Co., Inc.

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Davis Engrg. Corp.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

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Mount Hope Machinery Co.

FANS
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B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

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The Permutit Company
Stephens-Adamson Mfg. Co.

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Draper Bros. Corp.
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Stauber & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
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Cowles Chemical Co.
General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
Bird Machine Co.
The Sandy Hill Iron & Brass Works

FELT GUIDES
Black Clawson Company
Frank W. Egan & Co.
Gilbert & Nash Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Cyanamid Company, Industrial Chemicals Division
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
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Hungerford & Terry, Inc.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

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Egan, Frank W., & Co.
Lovejoy Flexible Coupling Co.
John Waldron Corp.

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Norton Co.

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The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Clark Equipment Company Industrial Truck Division
Towmotor Corp.

FORMATION TESTERS
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

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Downingtown Mfg. Co.
The Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Downingtown Mfg. Co.
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Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

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Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

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Norton Company

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Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works

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Stickle Steam Specialties Co.
Westinghouse Electric Corp.

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Davis Engrg. Corp.
E. D. Jones & Sons Co.
General Electric Co.
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

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The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
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B. F. Goodrich Chemical Co.

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Dilts Machine Works

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Clark Equipment Company Industrial Truck Division
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

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Bunge Pulp & Paper Co.
General Electric Company
W. & L. E. Gurley
National Technical Laboratories
B. F. Perkins & Son
Photovolt Corp.
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

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Lovejoy Flexible Coupling Co.
Shartle Bros. Mch. Co.

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Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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The Moore & White Co.
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Bauer Brothers Co.
Beckman Instruments, Inc.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
National Technical Laboratories
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
John Waldron Corp.

LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
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Michigan Steel Casting Co.
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National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

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Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Nopco Chemical Co.

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Thwing-Albert Instrument Co.

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The Sandy Hill Iron & Brass Works
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Shartle Brothers Machine Co.

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Dorr Company
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Ross Paper Machy. Corp.
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Black Clawson Company
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Hudson Sharp Machine Co.
Moore & White Co.
Redney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

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Bauer Brothers Co.
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Dilts Machine Works
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Morden Machines Co.
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Shartle Brothers Machine Co.
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Sutherland Refiner Corp.
Valley Iron Works

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Bird Machine Company
DeZurik Shower Company
General Electric Co.
Johnson Corp.
National Technical Laboratories
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Taylor Instrument Companies

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B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co., Resinous Products Div.

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J. J. Ross Company
Ross Paper Machy. Co.
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The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
U. S. Rubber Co.
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Waldron Corp., John
Wheeler Roll Co.

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Dilts Machine Works (Kohler Systems)
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Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
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The Sandy Hill Iron & Brass Works

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The Moore & White Co.
Shartle Bros. Mch. Co.

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Potdevin Machine Co.
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Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

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Testing Machines, Inc.

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Appleton Machine Company
Bird Machine Company
Carthage Machine Co.
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Dilts Machine Works, Inc.
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Moore & White Co.
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J. J. Ross Company
Ross Paper Machy. Co.
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Shartle Brothers Machine Co.
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Valley Iron Works Co.

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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

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Glidden Company
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Stein-Hall Co., Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

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General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Carthage Machine Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
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Hamblet Machine Co.
Hudson Sharp Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

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Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

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Nopco Chemical Co.

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Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.

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Williams-Gray Co.

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Michigan Steel Casting Co.
U. S. Steel Corp.

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The Hubinger Co.
National Starch Products Inc.
Stein-Hall Co., Inc.

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Shartle Bros. Mch. Co.

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Davis Engrg. Corp.
Johnson Corp.
Stickle Steam Specialties Co.

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Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL, CLAD
Babcock & Wilcox Co.
Lukens Steel Company

STEEL TANKS
Chicago Bridge & Iron Co.
The Sandy Hill Iron & Brass Works

STRETCH TESTER
Thwing-Albert Instrument Co.

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E. D. Jones & Sons Co.
Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

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Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Canadian Newsprint Supply Co.

SULPHUR
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Valley Iron Works Co.

SULPHUR DIOXIDE
American Cyanamid Company, Calco Chemical Div.
Virginia Smelting Co.

SUPERCALENDERS
The Appleton Machine Co.
B. F. Perkins & Son, Inc.

SYNTHETIC LATICES
American Cyanamid Company Industrial Chemicals Division
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Nopco Chemical Co.

TAKE OFF UNITS
Dilts Machine Works (Kohler Systems)

TALC
American Cyanamid Company, Industrial Chemicals Division
Vanderbilt Co., R. T.

TANKS
Chicago Bridge & Iron Co.
Kalamazoo Tank & Silo Co.
B. F. Perkins & Sons, Inc.
I. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

TEARING TESTERS
Thwing-Albert Instrument Co.
Testing Machines, Inc.

TENSILE TESTERS
Bunge Pulp & Paper Co.
Thwing-Albert Instrument Co.
B. F. Perkins & Sons, Inc.
Testing Machines, Inc.
Nopco Chemical Co.

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The Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Chicago Bridge & Iron Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
American Cyanamid Co., Calco Chemical Div.
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TOOLS
Walworth Company

TRACTORS AND TRUCKS
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Townsend Corp.

TRANSMISSIONS
Dodge Mfg. Corp.
Link Belt Company
Lovejoy Flexible Coupling Co.
Stephens-Adamson Mfg. Co.

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Crane Co.
Johnson Corporation
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

TUBE MILLS
F. L. Smidth & Co.

TUBES
Babcock & Wilcox Co.
National Tube Co.

TUBING MACHINES
Dilts Machine Works

TUBING, MECHANICAL
National Tube Co.

TUBS
Rodney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.

UNWINDERS
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
John Waldron Corp.

USED EQUIPMENT
Gibbs-Brower Co.
Thomas W. Hall Co.
J. J. Ross Company
Ross Paper Machy. Corp.
Shartle Brothers Machine Co.

V-BELTS
Lovejoy Flexible Coupling Co.

VALVES
Crane Company
Dilts Machine Works
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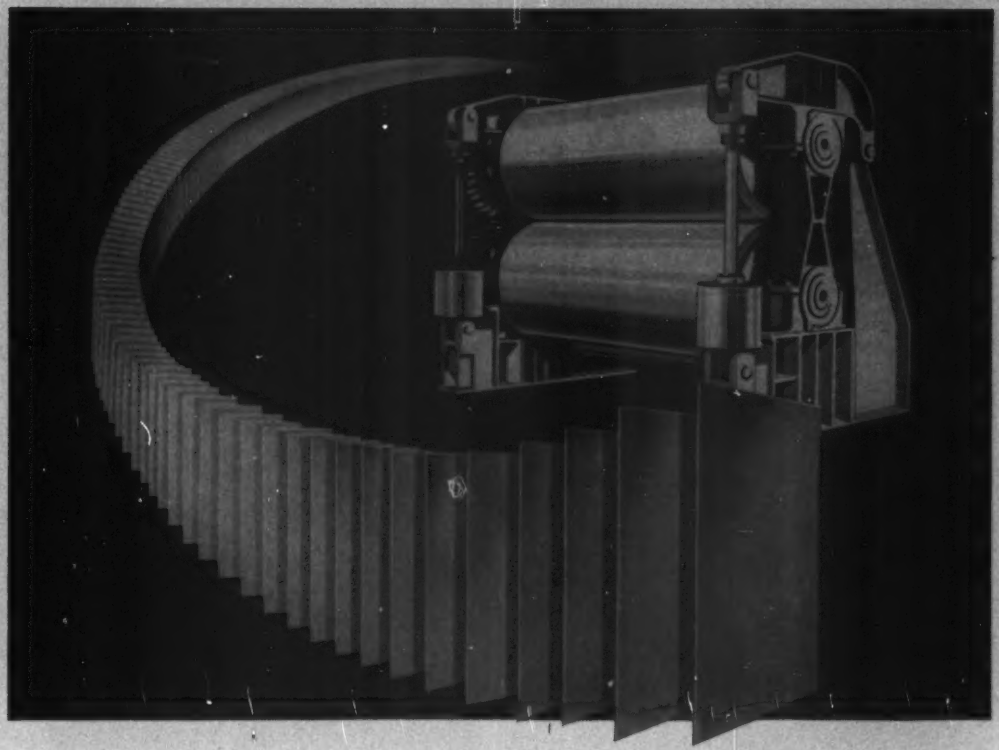

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